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THE LUNKENHEIMER CO.

CINCINNATI, OHIO, U. S. A.

Eng 1739.06

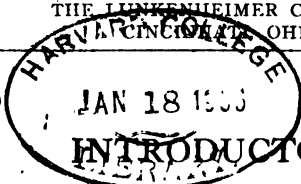


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INTRODUCTORY.

IN presenting to the trade this, our 1906 catalogue, we call particular attention to the many new specialties shown herein. Since issuing our last edition of the 1898 catalogue, we have erected a new and large plant of factory and office buildings which are unsurpassed by any structures of their kind. To more promptly supply the trade in the Eastern section of the country, we have established a New York Branch at 66-68 Fulton Street, where a full stock of our products will be found on hand at all times.

We have added many new tools and appliances for the accurate and rapid production of our goods and are in better position than ever to supply our products promptly and furnish goods which are unequalled as regards material and workmanship. These superior manufacturing facilities have been augmented by an exacting and rigorous system of shop inspection, to the end that the high reputation for superior quality of our products shall be maintained.

In conclusion, we take this occasion to thank our many friends and customers for their patronage, and can assure them that we will make their requirements our special study.

Soliciting a continuance of your orders, we remain

Yours faithfully,

THE LUNKENHEIMER COMPANY.

OFFICERS.

E. H. LUNKEN, PRESIDENT.

SAMUEL L. MOYER, VICE-PRESIDENT.

C. F. LUNKENHEIMER, VICE-PRESIDENT.

DAVID C. JONES, SECRETARY.

WILLIAM H. MUENCH, TREASURER.

HENRY RITTER, SUPERINTENDENT.

DIRECTIONS FOR ORDERING GOODS.

When ordering our products, we ask the trade to bear in mind that we do not make cheap or "competition" goods at all, our object being to supply the growing demand for valves and engineering specialties of superior quality as regards material and workmanship.

All the goods with screw connections described in this catalogue are threaded with standard pipe threads with the exception of Figures 533, 537, 759, 760 and 761, and these can be supplied as above when so ordered.

If possible, **ALWAYS SPECIFY GOODS BY FIGURE NUMBER.** By so doing you will often save considerable time and confusion. In ordering valves, specify whether Brass or Iron Body is desired, and whether wanted with screw or flange ends.

When telegraphing an order, the Code given on pages 24 to 24d can be used, thereby reducing cost of message.

Always remember that this book is a **REVISED** catalogue, supersedes all previous issues, and in it **THERE ARE CHANGES** from former publications; therefore, do not use our old catalogues when ordering.



LUNKENHEIMER STANDARD PACKAGES.

The above cut illustrates our present method of packing such of our specialties as will permit of same. These consist chiefly of Oil and Grease Cups, and the wooden boxes used are very strong, have lock-corners and sliding lids. They are neatly labeled, and are intended for the convenience of customers who carry our goods in stock.

On the following page is given a list of the number of the various sizes of Oil and Grease Cups that are packed in each box, and we would request that in the future the same be ordered in multiples of these numbers. Should the order be received otherwise, we will either increase or decrease the amount, thereby preventing a division of the contents of a package.

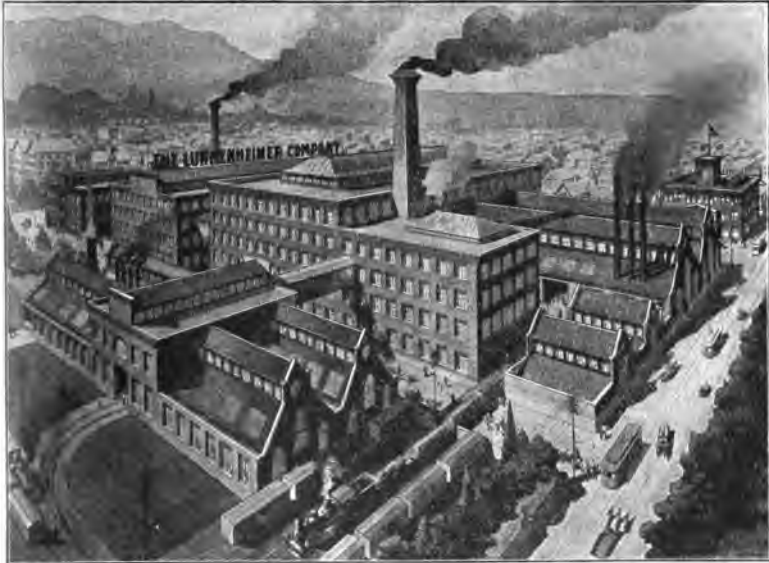
STANDARD PACKAGES OF LUNKENHEIMER SPECIALTIES. SLIDING LID WOODEN BOXES.

Fig. No.	Size	000	00	0	1	1½	2	3	3½	4	5	6	7	8	9
518	"Crown" Index Sight-Feed Oil Cup			12	12	12	12	6		4	2	1		1	
540	"Sentinel" Snap Lever Sight-Feed Glass Oil Cup			12	12	12	12	6		4	2	1		1	
525	"Miami" Plain Glass Oil Cup	12	12	12	12	12	12	6	4	2	1				
515	"Pioneer" Slide-Top Glass Oil Cup	12	12	12	12	12	12	6	4	2	1			1	
516	"Victor" Index Glass Oil Cup		12	12	12	12	12	6	4	2	1			1	
517	"Royal" Sight-Feed Glass Oil Cup	12	12	12	12	12	12	6	4	2	1			1	
523	Automatic Rod Cup—Screw Feed		12	12	12	12	12	6	4						
524	Automatic Rod Cup—Needle Valve		12	12	12	12	12	6	4						
510	"Ideal" Automatic Grease Cup		12	12	12	12	12	6	6						
512	"Marine" Screw-Feed Grease Cup		12	12	12	12	12	6	6						
511	"Jewel" Automatic Grease Cup		12	12	12	12	12	6	6						
924	"Lion" Automatic Grease Cup	6	6	4	4	4	4	4	2						
556	"Gem" Plain Grease Cup		12	12	12	12	12	6	6						
513	"Tiger" Plain Grease Cup		12	12	12	12	12	6	6						
489	"Banner" Sight-Feed Lubricator			4	4	4	4	4	2	1	1				
487	"Major" Sight-Feed Lubricator			4	4	4	4	4	2	1	1				
540	Plain Brass Oil Cup	24	24	24	24	12	12	12	12	6	6	6	4	4	
553	"Paragon" Gas Engine Sight-Feed Lubricator				6	6	4	4	2	1					
591	"Champion" Rod Oil Cup				6	6	4	4	2						
491	"Vulcan" Sight-Feed Lubricator				2	2	2	2	1	1					
666	"Mars" Gas Engine Sight-Feed Lubricator				2	2	2	2	1	1					
542	Plain Brass Oil Cup with L. H. Cock	24	24	24	24	12	12	12	12	6	6	6	4	4	
541	Plain Brass Oil Cup, Locomotive Pattern	24	24	24	24	12	12	12	12	6	6	6	4	4	
538	Hinge Lid Oil Cup—Small Base				24	12	12	12	12	6	6	6	6	6	
539	Hinge Lid Oil Cup—Large Base				24	12	12	12	12	6	6	6	6	6	
514	"Rex" Grease Cup														
533	Shaft Oilers				12	12	12	12	12						
534	Loose Pulley Oilers				12	12	12	12	12						

In addition to the above list, the following specialties are packed one in each box: Whistles, Figs. 441, 442, 443, 445, 446, 447, 448, 449, 450; Automatic Injectors, Fig. 756; Senior Sight-Feed Lubricators, Fig. 482; Junior Sight-Feed Lubricators, Fig. 486; Automatic Sight-Feed Graphite Lubricators, Fig. 490; Oil Pumps, Figs. 495 and 853; Mechanical Oil Pumps, Figs. 912, 913 and 949.

THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

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**WHERE THE LUNKENHEIMER CELEBRATED ENGINEERING SPECIALTIES
ARE MANUFACTURED.**

GENERAL OFFICES AND WORKS OF
THE LUNKENHEIMER COMPANY,
Cincinnati, Ohio, U. S. A.

INTERIOR VIEWS OF LUNKENHEIMER OFFICE AND
FACTORY BUILDINGS.



Office of E. H. LUNKEN, President.

Office of C. F. LUNKENHEIMER, Vice-President.

Office of S. L. MOYER, Vice-President.

INTERIOR VIEWS OF LUNKENHEIMER OFFICE AND FACTORY
BUILDINGS—Continued.



Office of WM. H. MUENCH, Treasurer.
Office of DAVID C. JONES, Secretary.
Office of HENRY RITTER, Superintendent.

**INTERIOR VIEWS OF LUNKENHEIMER OFFICE AND FACTORY
BUILDINGS—Continued.**



General Office.
Corner of Drafting Room.
Corner of Chemical Laboratory.

INTERIOR VIEWS OF LUNKENHEIMER OFFICE AND FACTORY
BUILDINGS—Continued.



Cost and Time Clerk's Office.

Main Engine Room.

High Pressure Testing Department—Showing Testing Boiler
Carrying 400 Pounds Steam Pressure per Square Inch.

THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

INTERIOR VIEWS OF LUNKENHEIMER OFFICE AND FACTORY
BUILDINGS—Continued.



Iron Valve Department.
A Portion of the Lubricator Department.
Corner of Brass Valve Department.

**INTERIOR VIEWS OF LUNKENHEIMER OFFICE AND FACTORY
BUILDINGS—Continued.**



**A Corner of the Tool Room.
Automatic Screw Machine Department.
Buffing and Polishing Department.**

HIGHEST AWARDS AT INTERNATIONAL EXPOSITIONS.



St. Louis, . . . 1904.



Buffalo, . . . 1901.



Paris, . . . 1900.



World's Fair, Chicago, 1893.

HIGHEST AWARDS AT INTERNATIONAL EXPOSITIONS—Continued.



ANTWERP,
1894.



PHILADELPHIA,
1876.



CINCINNATI,
1875.



CINCINNATI,
1874.



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CODE WORDS FOR NUMBER SIZES.

No. 0000	Ignoble.	No. 6	Jakamar.	No. 13	Jewbush.
No. 000	Imperial.	No. 6½	Jakana.	No. 13½	Jighead.
No. 00	Impish.	No. 7	Jammish.	No. 14	Jimson.
No. 0	Indican.	No. 7½	Janice.	No. 14½	Jingle.
No. 1	Indigent.	No. 8	Jannock.	No. 15	Jingling.
No. 1½	Infantry.	No. 8½	Japish.	No. 15½	Jonquil.
No. 2	Inquest.	No. 9	Jargon.	No. 16	Journey.
No. 2½	Insolent.	No. 9½	Jarnut.	No. 16½	Jubilant.
No. 3	Intruder.	No. 10	Jataka.	No. 17	Juddock.
No. 3½	Island.	No. 10½	Jauntish.	No. 18	Jumble.
No. 4	Jabber.	No. 11	Jaunty.	No. 19	Junket.
No. 4½	Jacent.	No. 11½	Jawbone.	No. 20	Junkish.
No. 5	Jacktan.	No. 12	Jentman.		
No. 5½	Jadding.	No. 12½	Jettage.		

CODE WORDS FOR INCH SIZES.

¾"	Painting.	3"	Partisan.	12"	Plunket.
¼"	Palace.	3½"	Pastel.	14"	Plush.
¾"	Pamper.	4"	Pedigree.	15"	Frank.
½"	Panade.	4½"	Pendant.	16"	Prodigal.
¾"	Pandanusa.	5"	Penitent.	18"	Progress.
1"	Pannage.	6"	Picket.	20"	Pugilism.
1¼"	Pantry.	7"	Pindar.	22"	Punctual.
1½"	Parable.	8"	Pinkany.	24"	Pungent.
2"	Paridin.	9"	Pluckily.		
2½"	Particle.	10"	Plunder.		

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CHEMICAL AND PHYSICAL TESTING LABORATORIES.

Having a desire to maintain all of our products at the highest standard of excellence possible, we installed some time ago very complete chemical and physical laboratories, which are in the hands of experienced chemists and engineers.

The knowledge we procure in this way enables us to construct and produce our specialties more scientifically than if we did not have these excellent facilities. This information also enables us to be perfectly safe in making the various guarantees specified in this catalogue, as we know exactly what to expect from our products.

During the past few years we have received a great many requests from manufacturers in the surrounding districts to make chemical and physical tests for them. As we are able to take care of considerable outside work, we have prepared a special price list covering same, which will be furnished upon application. We will be pleased to correspond with interested parties, and all inquiries will have prompt attention.

DIRECTIONS FOR SENDING SAMPLES.

Drillings of iron or steel may be sent by mail as fourth-class matter at the rate of one cent (1c) per ounce. When more than one sample is sent, precaution must be taken to prevent the different samples from becoming mixed in transit.

Samples should be distinctly marked for identification.

A clean, dry drill should be used for sampling, and care should be taken to avoid getting any grease or other foreign matter mixed with the drillings.

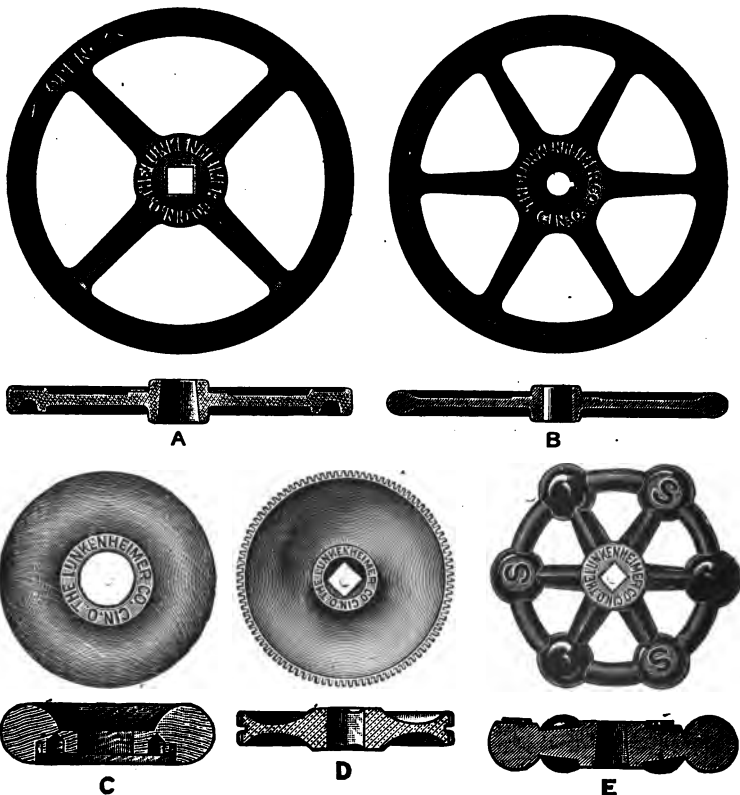
From two to three ounces of drillings are sufficient for any or all determinations.

When samples are sent, unless of ore, brick, slag, etc., they should be of such size and shape as to allow sufficient amount of drillings to be taken.

SECTION I.

STOP VALVES.

VALVE WHEELS.



Above are illustrated the various forms of Wheels used on different patterns of our valves. Their applications are as follows:

A—Brass Wheel, rough, rim finished or finished all over, used on navy composition valves, $\frac{1}{8}$ -inch and upward. Wheels for large valves have a greater number of spokes.

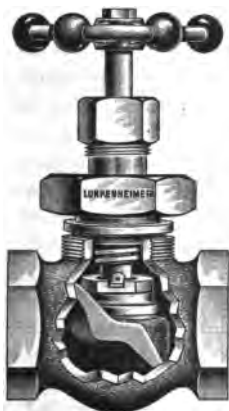
B—Iron Wheel, japanned, rim finished, or finished all over, used on iron valves, 2-inch and upward, and also on large brass valves.

C—Wood Wheel, used on valves $\frac{1}{4}$ -inch to 2 inches inclusive.

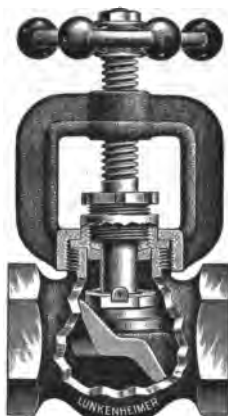
D—Finished Brass Wheel, with milled rim, used on valves $\frac{3}{8}$ to 2-inch inclusive.

E—Japanned Iron Ball Wheel, used on valves $\frac{1}{8}$ to 3 inches inclusive.

LUNKENHEIMER REGRINDING VALVES.



Valve with Internal Screw.



Valve with Outside Screw and Yoke.

The large sale of Lunkenheim Regrinding Valves has demonstrated that steam users appreciate the fact that it is possible to secure in them a reliable valve which can be repaired without disconnecting pipes and any further expense than the slight labor incurred in regrinding the seating surfaces. When a steam user installs Lunkenheim valves the expense ends with the purchase of the articles. This is not true with valves in which to secure a new seat bearing it is necessary to purchase extra parts; therefore, as a matter of economy, the first cost of the Lunkenheim valves should not be the principal consideration.

The expense of disconnecting pipes and taking out defective valves is many times more than the first cost of a good article, which, if installed in the first place, would render such expense unnecessary. Therefore, when installing pipe systems, it will be found better to purchase our valves rather than the common grades with which the markets are now flooded.

Many forms of valves have been placed upon the market, some of which have rubber, asbestos or copper discs, and, while for ordinary pressures (say up to sixty or eighty pounds) such valves give fair satisfaction, yet when the pressures are above that, they lack durability. Aside from this fact, in order to renew the seat bearing in such valves it is necessary to go to the expense of purchasing special discs, the sale of which is controlled by the manufacturer of the valves. Valves will not give satisfaction when any part of the seat bearing is composed of metal whose melting point is below, or very near, the temperature of steam at one hundred pounds pressure. Copper disc valves will, in course of time, prove unsatisfactory, for the reason that the copper disc, when subjected to heat for any period, undergoes a physical change and deteriorates very rapidly.

Lunkenheimer Regrinding Valves—Continued.

Lunkenheimer Valves are made entirely of only the highest grade of bronze, according to the formula specified by the United States Navy. This is a composition whose hardness is like unto that of steel, and will stand severe usage and wear a long time.

One of the best proofs of their accurate and faultless design and the correct principles of their construction is the fact that we have been manufacturing them for upwards of half a century without any radical changes in any of their lines. Our constant endeavor, however, has been to improve upon the quality and weight of the metal and workmanship, until today we are in position to challenge anyone to produce their equal. The elements of construction used in the Lunkenheimer Regrinding valves are large, well made and few in number. There is an absence of machine screws, loose parts and other devices of uncertain reliability and strength.

On the preceding page are shown two forms of regrinding valves, one of which has the operating stem on the inside of the trimmings, and the other has it outside and carried through a yoke fitting. The original form of Lunkenheimer regrinding valves is the one with the inside stem, but, for high pressure, it has been found that valves with outside thread and yoke are better adapted, for the reason that the operating stem does not come in contact with the steam, is not subjected to the same high temperature, and further than this, as it is accessible for oiling, is very durable. In making these yoke valves we have preserved the regrinding feature, and either pattern of this valve can be easily reground when worn, making them as good as new.

Referring to the illustration of the valve with internal screw, it will be noticed that the hub which carries the operating stem is secured to the body by a union connection, which, in turn, screws over the shell of the valve body. By means of this construction it is impossible for the hub and body to become corroded together, as the thread which holds the union ring to the body is protected at all times from the action of the steam, the joint being made between the flange on the hub and the neck of the body. This connection also acts as a tie or binder in screwing over the body and tends to make the valve rigid and strong.

Referring to the illustration of the valve with outside thread and yoke it will be noted that the yoke-piece which carries the operating stem screws over the body in such a manner as to hold the circular flanged hub (which carries the stuffing box) in place. In this form of valve the thread which holds the yoke is also protected from the action of the steam, so that the valve can always be taken apart readily, and it is equally as easy to regrind as the inside thread pattern. All yoke valves are furnished with stems made of rolled phosphor bronze; all other parts are made of Government composition.

Lunkenheimer Regrinding Valves—Continued.

The stuffing boxes on either style of valves can be repacked under pressure. To do this have the valve wide open. All parts of these valves are carefully made to gauges and templets, and are therefore interchangeable, and any worn-out piece can be easily and quickly renewed. They are so designed as to give the full area of the connecting pipes, and the metal in the body is distributed so as to thoroughly strengthen it. The hand wheels are rigidly held in place by means of lock-nuts screwed on the stem, which facilitates the removal of same whenever desired.

An excellent proof of their superiority is the fact that these forms of valves have been adopted by the United States Navy as standard, and in the new vessels now being built they are used almost exclusively. They are also extensively used in the merchant marine, on river steamboats, locomotives, and in all high-class power plants where the service is severe and a good valve is a necessity.

We call particular attention to the great care exercised in the manufacture of these goods, and can assure our patrons that the workmanship is first class in every particular. The stuffing boxes of all valves are packed with our Patent Moulded Asbestos Ring Packing, which possesses such a high degree of durability that they will not, under ordinary conditions, require repacking for several years. All valves above $\frac{3}{4}$ -inch size have gland follower in stuffing box. Every one of our valves is thoroughly tested before being sent out from the factory, and each one is ready for immediate use. When so desired, these valves can be furnished with round slotted hub rings in place of hexagon, without extra charge. They are made in two weights; i. e., regular (or medium) and extra heavy patterns; the former for pressures up to 200 pounds, the latter to stand 300 pounds working pressure. In ordering, unless extra heavy is specified, we will send our regular (or medium) pattern. Medium Pattern Valves have the name LUNKENHEIMER cast in the side of the valve body in sunken letters, while on the Extra Heavy Pattern the name appears in raised letters.

To regrind either pattern, unscrew the union ring or the yoke, as the case may be, take trimmings from body and place a little powdered sand or glass and soap or oil on the disc, inserting a wire or pin through the slot in disc locknut and hole in stem to secure the disc to the stem; then replace trimmings in valve body and regrind, leaving the ring or yoke unscrewed so that the hub rotates in the body and acts as a guide for the stem while regrinding. In case the seat of the valve should be so badly cut or worn that it would be difficult to regrind, a new seat bearing can be very easily formed by means of the steel reamers which we are prepared to furnish. We would say, however, that the use of a reamer is rarely necessary, as it is usually very easy to regrind our valves when worn.

All genuine valves have the name LUNKENHEIMER cast in the valve body, a direction tag is attached, and wheel has letters S cast on balls of same. None genuine without these marks.

LUNKENHEIMER
MEDIUM PATTERN REGRINDING VALVES.

Screw Ends.

BRASS.



Fig. 407. Globe Valve.



Fig. 588. Cross Valve.



Fig. 408. Angle Valve.

Our Medium Pattern Globe, Angle and Cross Valves with Screw Ends are guaranteed to stand a working pressure of 200 pounds. They have full area of pipe in the seat opening and around the diaphragm. The valves can be reground without the necessity of removing them from the pipe, and can be packed while under pressure. All valves have full threads, and the pipe ends are in line or at perfect angles. They are made with English pipe threads when so ordered.

Unless otherwise specified, they will be furnished with hexagon bonnet rings, up to 2 inches inclusive, above which slotted rings are furnished, though either hexagon or slotted rings can be had for any size without extra charge.

The principles of construction of these valves are fully described on pages 20, 30 and 31.

PRICE LIST.

SIZE, .....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4		
Globe Valves, Brass,.....each	70	70	85	1 15	1 45	2 00	2 80	3 90	6 20	12 00	16 50	30 00	40 00
Angle Valves, Brass,.....each	70	70	85	1 15	1 45	2 00	2 80	3 90	6 20	12 00	16 50	30 00	40 00
Cross Valves, Brass,.....each	1 00	1 00	1 00	1 50	2 00	2 70	3 50	5 10	8 00	16 00	24 00	38 00	50 00
Globe Valves, finished all over with Finished Brass Wheel, Brass, Fig. 358, each	1 75	1 90	2 15	2 50	3 10	3 65	5 25	7 25	10 75	22 00	33 50	.....	.....
Angle Valves, finished all over with Finished Brass Wheel, Brass, Fig. 357, each	1 75	1 90	2 15	2 50	3 10	3 65	5 25	7 25	10 75	22 00	33 50	.....	.....
Cross Valves, finished all over with Finished Brass Wheel, Brass, Fig. 356, each	2 40	2 60	2 90	3 30	4 20	4 90	7 00	9 70	14 30	29 30	44 70	.....	.....

For general dimensions see list on page 390.

All genuine valves have the name LUNKENHEIMER cast in valve shell and wheel has letters S on same.

The above can be had with rough or finished brass hand wheels. See page 37 for extra charge to be added to above list.

LUNKENHEIMER
MEDIUM PATTERN REGRINDING VALVES.

Flange Ends.

BRASS.

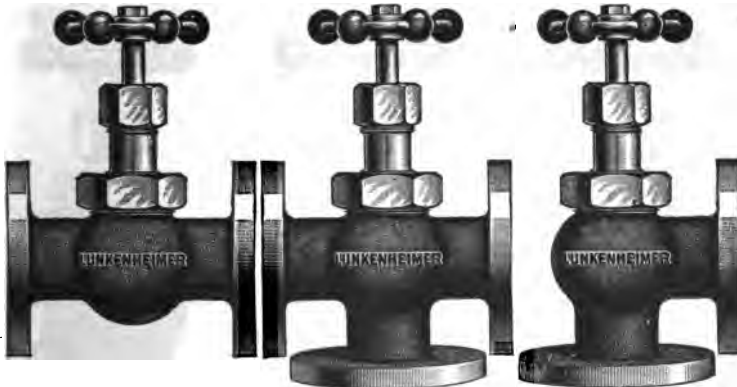


Fig. 580.
Globe Valve.

Fig. 582.
Cross Valve.

Fig. 581.
Angle Valve.

Our Medium Pattern Regrinding Valves with Flange Ends are guaranteed to stand a working pressure of 200 pounds per square inch. Pages 29, 30 and 31 fully describe the principles of their construction.

We are prepared to furnish English Standard Flanges instead of American Standard when so ordered, and the valves can be had with Navy Standard Flanges and Brass Wheels at a special discount from price list below.

Unless otherwise ordered, valves will be sent with hexagon bonnet rings up to 2 inches inclusive above which slotted rings are furnished, though either hexagon or slotted rings can be had for any size without extra charge.

PRICE LIST.

Size, .....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Globe Valves,.....each	2 20	3 40	4 70	5 80	8 00	11 00	14 50	21 00	29 00	39 00	52 00
Angle Valves,.....each	2 20	3 40	4 70	5 80	8 00	11 00	14 50	21 00	29 00	39 00	52 00
Cross Valves,.....each	3 20	5 10	7 00	8 40	12 00	15 00	20 50	29 00	40 00	52 00	69 00

For general dimensions see list on page 390.

All genuine valves have the name LUNKENHEIMER cast on valve shell and wheel has letters S on same.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra price list to be added to above list.

LUNKENHEIMER

EXTRA HEAVY PATTERN REGRINDING VALVES.

Screw Ends.

BRASS



Fig. 409.
Globe Valve.



Fig. 620.
Cross Valve.



Fig. 557.
Angle Valve.

The above illustrates our Extra Heavy Pattern Regrinding Valves with Screw Ends, which are guaranteed to stand a working pressure of 300 pounds per square inch. Pages 29, 30 and 31 fully describe the construction of these valves.

They can be had with English pipe threads when so ordered. From $\frac{1}{4}$ to 2 inches inclusive, the valves are furnished with hexagon bonnet rings and with slotted rings above 2 inches, though either hexagon or slotted rings can be had for any size desired without extra charge.

PRICE LIST.

Size, .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Globe Valves, Screw Ends,....each	90 1 10 1 50 2 30 3 60 5 10 7 10 10 90 19 50 29 00 42 30 53 90										
Angle Valves, Screw Ends,....each	90 1 10 1 50 2 30 3 60 5 10 7 10 10 90 19 50 29 00 42 30 53 90										
Cross Valves, Screw Ends,....each	1 20 1 30 1 90 2 90 4 50 6 30 8 60 13 10 23 40 34 50 50 40 63 60										

For general dimensions see list on page 391.

All genuine valves have the name LUNKENHEIMER cast on valve shell and wheel has letters S on same.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra price to be added to above list.

LUNKENHEIMER
EXTRA HEAVY PATTERN REGRINDING VALVES.

Flange Ends.

BRASS.

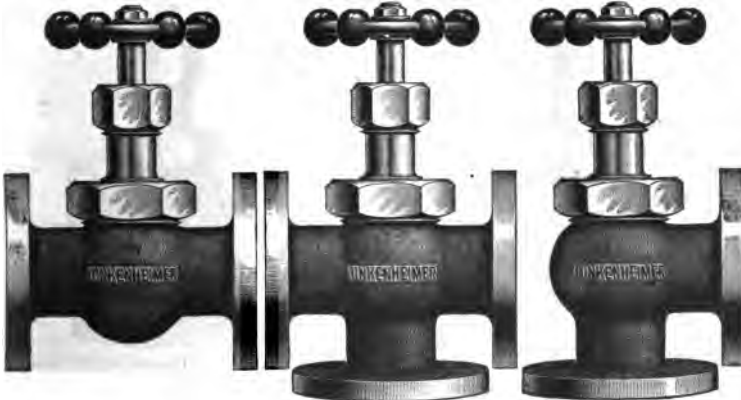


Fig. 410.
Globe Valve.

Fig. 412.
Cross Valve.

Fig. 411.
Angle Valve.

The above will stand a working pressure of 300 pounds per square inch and are guaranteed in every respect. A complete description of their construction is given on pages 29, 30 and 31. They can be had with English Standard Flanges or at a special discount from price list below they will be furnished with Navy Standard Flanges and Brass Wheels, or tongued and grooved flanges can be had if desired, also valves with flanges of the same diameter as the Extra Heavy American Standard.

Hexagon bonnet rings up to 2 inches inclusive and slotted rings above 2 inches will always be furnished, unless otherwise specified, though either slotted or hexagon rings can be had at the same price.

PRICE LIST.

Size, .....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Globe Valves, Flange Ends, each	2 50	4 10	5 80	7 60	11 00	14 00	20 00	32 00	44 00	60 00 74 00
Angle Valves, Flange Ends, each	2 50	4 10	5 80	7 60	11 00	14 00	20 00	32 00	44 00	60 00 74 00
Cross Valves, Flange Ends, each	3 50	5 90	8 20	10 50	14 50	19 00	27 00	43 00	57 00	77 00 94 00

* For general dimensions see list on page 301.
All genuine valves have the name LUNKENHEIMER cast on valve shell and wheel has letters S on same.
The above can be furnished with rough or finished brass hand wheels. See page 37 for extra price to be added to above list.

LUNKENHEIMER MEDIUM AND EXTRA HEAVY PATTERN REGRINDING VALVES.

"Special" Screw and Flange Ends.

BRASS.



Fig. 684. Medium Pattern Globe Valve. Fig. 685. Medium Pattern Angle Valve.
Fig. 789. Extra Heavy Pattern Globe Valve. Fig. 790. Extra Heavy Pattern Angle Valve.

For special requirements, and for 200 and 300 pounds working pressure, respectively, we can furnish our Medium and Extra Heavy Pattern Regrinding Globe and Angle Valves with Screw and Flange Ends. A complete description of these valves is given on pages 29, 30 and 31.

Up to 2 inches inclusive, the above are furnished with hexagon bonnet rings, above which slotted rings are furnished unless otherwise specified, though either hexagon or slotted rings can be had at the same price. They are also furnished with English instead of American Standard Pipe Threads and Flanges when so ordered.

When ordering be sure to specify whether the inlet or outlet end is to be flanged.

PRICE LIST.

Size, .....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Medium Globe Valve, Screw and Flange Ends, .....each	1 40	2 10	3 00	3 70	5 30	7 10	10 10	14 90	21 10	27 60	39 90
Extra Heavy Globe Valve, Screw and Flange Ends, .....each	1 60	2 60	3 80	5 20	7 20	9 80	14 40	23 90	33 20	45 80	57 20
Medium Angle Valve, Screw and Flange Ends, .....each	1 40	2 10	3 00	3 70	5 30	7 10	10 10	14 90	21 10	27 60	39 90
Extra Heavy Angle Valve, Screw and Flange Ends, .....each	1 60	2 60	3 80	5 20	7 20	9 80	14 40	23 90	33 20	45 80	57 20

Valves with radial instead of straight flange will be charged at higher prices than above list. In ordering, always send sketch of exactly what is required, also radius of flange. The above lists are for valves with heavy standard flange on one end and female thread on the other end, but if male thread is desired on screw end or blank stud in addition to flange, there will be an extra charge.

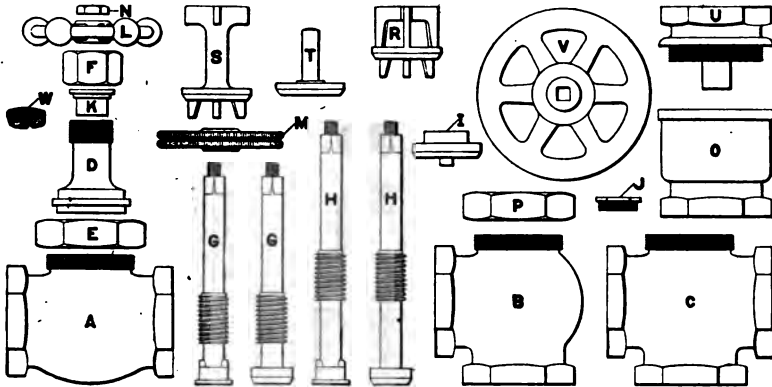
For dimensions see pages 390 and 391.

All genuine valves have the name LUNKENHEIMER cast on valve shell and wheel has letters S on same.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra price to be added to above list.

LIST OF PARTS OF LUNKENHEIMER

Medium Pattern Regrinding Globe, Angle, Cross and Horizontal,
Angle and Vertical Check Valves.



PRICE LIST.

Size of Valve,.....inches	½	¾	1	1¼	1½	2	2½	3	3½	4			
A Body for Globe or Horizontal Check Valves, each	25	30	35	50	75	1 20	1 55	2 30	4 20	6 50	13 00	19 00	26 00
B Body for Angle or Angle Check Valve,.....each	25	30	35	50	75	1 20	1 55	2 30	4 20	6 50	13 00	19 00	26 00
C Body for Cross Valve, each	35	35	45	70	1 00	1 60	2 00	3 00	5 60	8 65	16 90	22 20	27 50
D Hubs,.....each	15	18	20	25	30	45	70	90	1 10	2 20	3 90	7 20	8 50
E Hexagon Rings,.....each	13	13	15	20	25	35	45	70	1 00	1 80	2 50	3 80	5 25
F Stuffing Boxes,.....each	09	10	11	18	22	25	27	30	40	70	1 00	1 55	1 80
G Stems for Globe Valves,.....each	16	18	20	27	35	40	55	75	1 10	1 45	2 55	3 80	4 80
H Stems for Angle or Cross Valves,.....each	16	18	20	27	35	40	55	75	1 10	1 45	2 55	3 80	4 80
I Discs for Globe, Angle or Cross Valves,.....each	.....	.....	.....	.....	.....	18	25	35	60	1 10	2 35	3 10	3 70
J Locknut for Discs,.....each	07	07	07	07	07	07	10	12	15	20	35	45	65
K Glands,.....each	.....	.....	.....	.....	.....	11	16	18	22	35	45	65	90
L Wheels (Iron),.....each	09	12	12	13	17	17	20	22	35	55	80	1 10	1 45
M Wheels (Brass), Solid Pattern Knurled Edge,.....each	27	37	37	53	70	85	1 00	1 20	1 70	.....	.....	.....	.....
N Locknuts for Wheel,.....each	05	05	06	06	07	07	07	09	11	15	25	35	45
O Body for Vertical Check Valve,.....each	22	33	40	53	77	1 10	1 55	2 20	3 10	7 70	11 00	15 70	22 00
P Caps for Horizontal and Angle Check Valve,.....each	15	22	27	33	45	55	70	90	1 35	2 25	3 55	4 20	6 45
R Discs for Horizontal Check Valve,.....each	11	18	22	25	35	45	55	80	1 35	2 20	3 35	4 00	6 10
S Discs for Angle Check Valve,.....each	11	18	22	25	35	45	55	80	1 35	2 20	3 35	4 00	6 10
T Discs for Vertical Check Valve,.....each	11	18	22	25	35	45	55	80	1 35	2 20	3 35	4 00	6 10
U Tops for Vertical Check Valve,.....each	18	25	31	35	55	88	1 10	1 55	2 20	4 20	7 10	11 00	17 70
V Wheel (Brass Rough-Spoke Pattern),.....each	20	20	20	31	45	55	77	1 00	1 20	2 10	2 75	3 75	5 90
W Packing,.....each	05	07	07	07	09	09	10	11	13	15	30	45	55

LUNKENHEIMER
MEDIUM PATTERN REGRINDING VALVES.

With Screwed Yoke and Outside Thread on Stems. Screw Ends.

BRASS.



Fig. 708.
Cross Valve.



Fig. 419.
Globe Valve.



Fig. 707.
Angle Valve.

This form of valve differs somewhat from the other pattern of Regrinding Valves on pages 32 to 36, inasmuch as the threads on the operating stem are outside of the valve trimming, and are carried through a yoke piece screwed over the valve body. As the threads on the stem do not come in contact with the steam and are accessible for oiling, the life of same is prolonged. The yoke piece is heavy and well designed, and the whole construction is strong and rigid. This design of valve is also explained on pages 29, 30 and 31. When the seat bearing is worn it is as easy to regrind as the other form of Regrinding Valve. The operating stem is made of rolled bronze, and the balance of the valve of gun-metal composition, hence it is very durable. These valves are suitable for pressures up to 200 pounds per square inch, and many users consider them a more desirable and durable form than the pattern with internal stem threads. They are extensively used on vessels of the United States and foreign navies, river steamboats, also lake and ocean steamers.

The valves can be had with English Standard of Pipe Threads instead of American Standard, if desired.

PRICE LIST.

Size.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$
Globe Valves.....each	1 60	2 20	3 20	4 20	5 50	7 90	13 00
Angle Valves.....each	1 60	2 20	3 20	4 20	5 50	7 90	13 00
Cross Valves.....each	2 20	2 70	4 10	5 20	6 70	9 40	15 60

For general dimensions see list on page 392.

All genuine valves have the name LUNKENHEIMER cast in body.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra charge to be added to above list.

LUNKENHEIMER
MEDIUM PATTERN REGRINDING VALVES.

With Screwed Yoke and Outside Thread on Stems. Flange Ends.
BRASS.

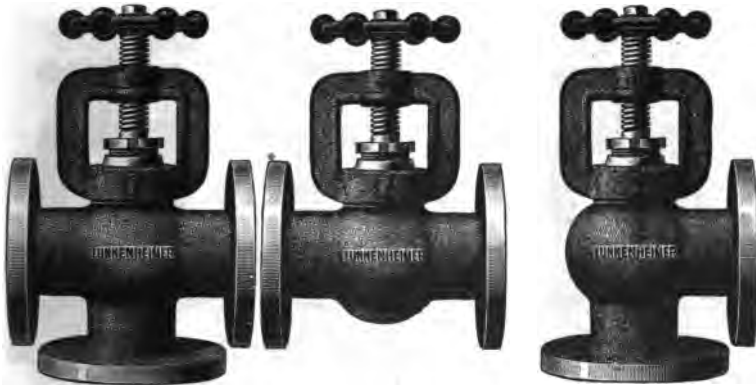


Fig. 711.
Cross Valve.

Fig. 709.
Globe Valve.

Fig. 710.
Angle Valve.

Pages 29, 30 and 31 give a full description of the above, which are guaranteed to stand a working pressure of 200 pounds per square inch.

English Standard Flanges will be furnished instead of American Standard when so ordered. At a special discount from the price lists below, they can be had with Navy Standard Flanges and Brass Wheels, or with one end screwed and the other end flanged.

PRICE LIST.

Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$
Globe Valves,.....each	4 00	5 50	6 70	9 20	12 00	16 00	22 50
Angle Valves,.....each	4 00	5 50	6 70	9 20	12 00	16 00	22 50
Cross Valves,.....each	5 70	7 70	9 30	13 00	16 50	21 50	30 00

For general dimensions see list on page 392.

All genuine valves have the name LUNKENHEIMER cast in body.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra charge to be added to above list.

LUNKENHEIMER**EXTRA HEAVY PATTERN REGRINDING VALVES.****With Screwed Yoke and Outside Thread on Stems. Screw Ends.****BRASS.****Fig. 716.**
Cross Valve.**Fig. 714.**
Globe Valve.**Fig. 715.**
Angle Valve.

Our Extra Heavy Pattern Regrinding Valves with Screwed Yoke are designed to stand a working pressure of 300 pounds per square inch, for which pressure they are guaranteed. See pages 29, 30 and 31 for a complete description of the above.

PRICE LIST.

Size, .....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Globe Valves,.....each	2 30	3 00	5 70	7 70	10 00	14 50	23 60
Angle Valves, .....each	2 30	3 00	5 70	7 70	10 00	14 50	23 60
Cross Valves,.....each	3 00	3 90	7 20	9 60	12 20	17 40	28 40

For general dimensions see list on page 393.

All genuine valves have the name LUNKENHEIMER cast in body.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra charge to be added to above list.

LUNKENHEIMER
EXTRA HEAVY PATTERN REGRINDING VALVES.
With Screwed Yoke and Outside Thread on Stems. Flange Ends.
BRASS.

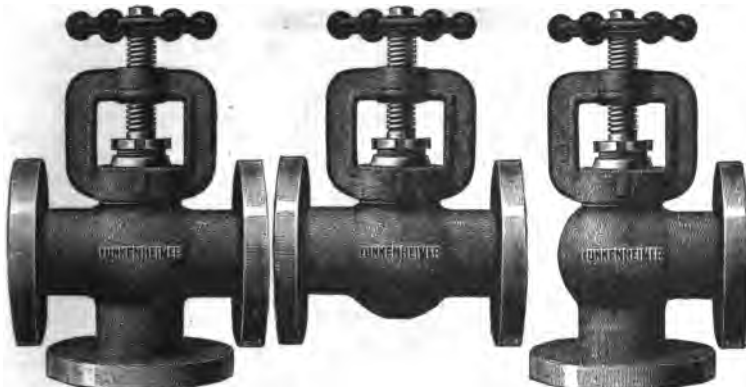


Fig. 719.
Cross Valve.

Fig. 717.
Globe Valve.

Fig. 718.
Angle Valve.

Our Extra Heavy Pattern Regrinding Valves with Outside Thread on Stems are guaranteed to stand a working pressure of 300 pounds. A complete description of the above is given on pages 29, 30 and 31. At a special discount from price lists below these valves will be furnished with Navy Standard Flanges and Brass Hand Wheels. They can also be had with English instead of American Standard Flanges, or they can be had with tongue and groove flanges instead of straight flanges as shown in cuts, or with one end screwed and the other end flanged. If desired, valves with flanges of the same diameter as the Extra Heavy American Standard can be furnished.

PRICE LIST.

Size, .....Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Globe Valves,.....each	4 90	6 50	9 70	13 50	17 00	24 00	36 00
Angle Valves,.....each	4 90	6 50	9 70	13 50	17 00	24 00	36 00
Cross Valves,.....each	7 00	9 10	13 00	18 00	23 00	31 00	48 00

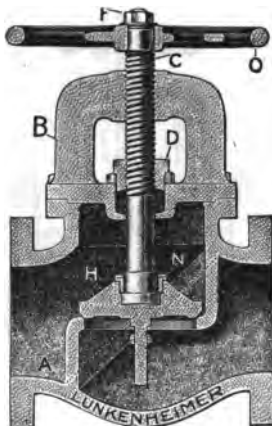
For general dimensions see list on page 393.

All genuine valves have the name LUNKENHEIMER cast on body.

The above can be furnished with rough or finished brass hand wheels. See page 37 for extra charge to be added to above list.

LUNKENHEIMER FLANGED HUB BRASS VALVES.

Outside Screw and Yoke.



Section of Flanged Hub Brass Globe Valve.

Lunkenheim Brass Flanged Hub Globe, Angle and Cross Valves are extensively used all over the world and are universally acknowledged as standard. They are made in two weights, which we term "Medium" and "Extra Heavy" Patterns, and are guaranteed to stand steam working pressures up to 150 and 300 pounds respectively.

Careful attention has been given to the design of this line of Valves, and we can safely recommend them to our trade with the assurance that perfect satisfaction will result from their use.

The yoke B is very strong and rigid and is firmly held to the body A by steel studs and bronze nuts. The material is of the very highest grade of bronze composition, such as is required by the United States Government, and is scientifically distributed throughout the body so as to insure the greatest strength where most required.

We call particular attention to the fact that the diaphragms in the bodies are constructed with easy sweeps, so as to avoid all unnecessary resistance to the free flow of steam or water. The area of the seat opening around the diaphragm is considerably in excess of that of the connecting pipe, and there are no contracted areas in the body.

The advantages in valves of outside screw and yoke construction are that the stem does not come in contact with the threads on the stem, and also that the threads are accessible for oiling, which is quite a desirable feature, as it aids the easy operation and prolongs the life of the stem.

The handwheel O is rigidly held in place on the stem C by a lock-nut F, which permits of the valve being easily taken apart or assembled, and the diameter of the wheel is such that the valve can easily be opened or closed without the necessity of additional leverage (such, for instance, as a wrench being applied thereto) to form a tight bearing between the disc and its seat.

Flanged Hub Brass Valves.—Continued.

In the screw end valves the pipe threads are full and perfect and are made quite long, thereby insuring a tight and safe joint between the valve and pipe. There is also ample clearance between the end of the threads and the wall of the diaphragm. The pipe ends are in perfect line or at absolute right angles to each other, a very important feature for the proper erection of piping.

The stuffing box can readily be repacked while the steam is on and the valve wide open. To do this, however, it should be opened as far as possible, when a shoulder on the stem C will form a seat on the underside of the stuffing-box and thereby prevent the escape of steam.

The disc H is well guided at the top by the stem C, and at the bottom by the disc stem, which moves freely in a guide cast in the body A. Should the seat wear and thereby cause the valve to leak, a new seat bearing can easily be had by regrinding, to do which it is not necessary to remove the valve from the pipe.

TO REGRIND: Remove the yoke B from the body A, when all of the trimmings will follow. By unscrewing the lock-nut F, the handwheel O can easily be lifted off the stem, after which the yoke can be removed. Place a wire in the slot of the disc lock-nut N, and through the hole in the stem provided therefor, which will prevent the disc from turning on the stem. Then place a small quantity of powdered sand or glass and soap or oil on the disc and regrind, to facilitate which the hand wheel can be replaced on the stem. While regrinding, the disc is sufficiently guided by the stem on the bottom thereof, and consequently no guide is needed at the top. After regrinding carefully wipe off the abrasive material from the disc and seat, remove the wire through the disc lock-nut and stem and replace the yoke and trimmings. If properly reground, the valve will be found as serviceable as when new.

Brass valves of this kind are extensively used in the United States Navy and in Marine work, where strong, durable and practical constructions only are employed. The valves undergo a rigid test and careful inspection before being sent out of the factory, the stuffing-boxes are packed and they are ready for immediate use.

When so ordered, our Extra Heavy valves are furnished with by-pass, and upon application we would be pleased to submit prices and dimensions.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
FLANGED HUB BRASS VALVES.

Medium Pattern.

Outside Screw and Yoke. Screw Ends.



Fig. 695.
Cross Valve.



Fig. 693.
Globe Valve.



Fig. 694.
Angle Valve.

For a complete description of the above see pages 42 and 43. These valves, being our medium pattern, were designed and are guaranteed to stand a working pressure of 150 pounds per square inch. Should the seats wear, they can be re-ground and the valves can also be packed while under pressure.

When so ordered, English Standard Pipe Threads instead of American Standard will be furnished.

PRICE LIST.

Size .....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Globe Valves.....each	9 30	10 70	18 00	26 00	37 00	47 00	59 00	75 00	100 00	150 00	205 00
Angle Valves..... each	9 30	10 70	18 00	26 00	37 00	47 00	59 00	75 00	100 00	150 00	205 00
Cross Valves.....each	10 70	13 00	21 00	31 00	44 00	56 00	69 00	88 00	115 00	170 00	240 00

For general dimensions see list on page 394.

All genuine valves have the name LUNKENHEIMER cast in body.

*The above are furnished with iron hand wheels unless otherwise specified.
See page 37 for extra charge to be added to above list for brass hand wheels.*

LUNKENHEIMER
FLANGED HUB BRASS VALVES.

Medium Pattern.

Outside Screw and Yoke. Flange Ends.



Fig. 698.
Cross Valve.

Fig. 696.
Globe Valve.

Fig. 697.
Angle Valve.

These valves are guaranteed to stand a working pressure of 150 pounds per square inch. For a complete description, see pages 42 and 43.

At a special discount from price list below, the valves can be had with Navy Standard Flanges and Brass Wheels, and when so ordered, English Standard Flanges will be furnished instead of American Standard.

Where required, these valves can be furnished with only one end flanged and the other end with male or female thread. Prices on application.

PRICE LIST.

Size .....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Globe Valves .....each	15 50	19 00	27 00	37 00	50 00	61 00	75 00	91 00	115 00	170 00	235 00
Angle Valves.....each	15 50	19 00	27 00	37 00	50 00	61 00	75 00	91 00	115 00	170 00	235 00
Cross Valves.....each	19 50	23 00	32 00	44 00	60 00	72 00	87 00	110 00	140 00	200 00	270 00

For general dimensions see list on page 394.

All genuine valves have the name LUNKENHEIMER cast in body.

The above are furnished with iron hand wheels unless otherwise specified.

See page 37 for extra charge to be added to above list for brass hand wheels.

LUNKENHEIMER
FLANGED HUB BRASS VALVES.

Extra Heavy Pattern.
Outside Screw and Yoke. Screw Ends.



Fig. 724.
Cross Valve.



Fig. 722.
Globe Valve.



Fig. 723.
Angle Valve.

Lunkenheim Flanged Hub Brass Valves, Extra Heavy Pattern, are guaranteed to stand a working pressure of 300 pounds per square inch. A complete description will be found on pages 42 and 43. The pipe threads will be furnished English instead of American Standard when so ordered.

PRICE LIST.

Size.....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Globe Valves.....each	13 50	17 00	24 00	34 00	47 00	62 00	77 00	98 00	125 00	180 00	255 00
Angle Valves.....each	13 50	17 00	24 00	34 00	47 00	62 00	77 00	98 00	125 00	180 00	255 00
Cross Valves.....each	17 50	20 00	29 00	41 00	56 00	73 00	90 00	115 00	150 00	210 00	295 00

For general dimensions see list on page 395.

All genuine valves have the name LUNKENHEIMER cast on the body.

The above are furnished with iron wheels unless otherwise specified. See page 37 for extra charge to be added to above list for brass hand wheels.

**LUNKENHEIMER
FLANGED HUB BRASS VALVES.**

Extra Heavy Pattern.

Outside Screw and Yoke. Flange Ends.



**Fig. 727.
Cross Valve.**



**Fig. 725.
Globe Valve.**



**Fig. 726.
Angle Valve.**

These valves are similar to the ones shown on page 46 with the exception that they have flange instead of screw ends. They are guaranteed for a working pressure of 300 pounds per square inch. If desired, English Standard Flanges can be had instead of American Standard, and, at a special discount from price list below, the valves can be had with Navy Standard Flanges and Brass Wheels, or with flanges of the same diameter as the American Extra Heavy Standard.

For a general description of the above see pages 42 and 43.

Where required, they can be had with tongue and groove instead of straight flanges as shown in cuts. We can also supply them with one end flanged and the other end with male or female thread. Prices upon application.

PRICE LIST.

Size.....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Globe Valves.....each	22 00	28 00	36 00	44 00	63 00	80 00	97 00	120 00	150 00	205 00	280 00
Angle Valves.....each	22 00	28 00	36 00	44 00	63 00	80 00	97 00	120 00	150 00	205 00	280 00
Cross Valves.....each	29 00	34 00	44 00	59 00	75 00	95 00	115 00	140 00	175 00	240 00	325 00

For general dimensions see list on page 395.

All genuine valves have the name LUNKENHEIMER cast on body.

The above are furnished with iron hand wheels unless otherwise specified. See page 37 for extra charge to be added to above list for brass hand wheels.

LUNKENHEIMER REVENUE CUTTER SERVICE TYPE OF VALVES.

Outside Screw and Yoke. Flange Ends.

BRASS.



Fig. 875M.
" 875H.
" 875R.
" 875S.
" 875T.

Globe Valve.

Fig. 877M.
" 877H.
" 877R.
" 877S.
" 877T.

Cross Valve.

Fig. 876M.
" 876H.
" 876R.
" 876S.
" 876T.

Angle Valve.

Those conversant with the requirements of the Revenue Cutter Service will appreciate the fact that only valves capable of standing long and severe usage are used. Lunkenheim Revenue Cutter Service Type of Valves are extensively used in the Service and have been giving general satisfaction in every respect.

The cast parts of the valve are made of a high-grade bronze composition, (such as is required by the Service), which is very strong and durable, and which readily withstands the severe usage to which the valve is subjected. The studs and operating stem are made of Tobin Bronze, a material as strong as steel and which is also required by the Service, the whole valve being made of bronze to better withstand the oxidizing effect of the moist sea atmosphere. The metal is scientifically distributed about the valve so as to insure the greatest strength where most required.

It will be noticed by reference to pages 42 to 47 that unlike the valves described and illustrated thereon, the yoke A is not cast integral with the flange B, but is separately and rigidly bolted thereto by means of bronze studs and nuts.

Lunkenheimer Revenue Cutter Service Type of Valves—Continued.

The flanges are finished, thus insuring a good bearing surface for the nuts, and, if desired, the back of the pipe flanges can also be finished.

We call particular attention to the design of the body, which is not only massive in appearance, but is constructed with regard to strength and area. The area about the diaphragm is considerably greater than that of the connecting pipe, as is also that of the seat opening, and the steam has a free and unobstructed passage through the valve, there being no contracted areas whatever about the body.

The hand wheel C is made of brass, and is of ample diameter to easily control the operation of the valve, and by means of the lock-nut D it can be readily removed, which facilitates the taking apart or assembling of the valve.

The stuffing boxes are held in place by bronze studs and nuts, and can be packed while the pressure is on and the valve open, to do which, however, it is necessary that the valve be opened as wide as possible, thereby causing a shoulder on the stem to seat against the under part of the stuffing box.

The disc E is well guided at both top and bottom, and can be as easily reground as our other forms of Regrinding Valves.

TO REGRIND.—Remove the yoke A and flange B, when the entire trimmings will follow. By removing the hand wheel C, the stem can then be taken out of the yoke to facilitate regrinding. Place a wire in the slot in the disc lock-nut and through the hole in the stem to prevent the disc from turning independent of the stem. Then place a little abrasive material on the disc and carefully regrind, replacing the hand wheel on the stem to more easily control the operation. To aid in guiding the stem while regrinding, the flange B should remain on the valve, and this, together with the guide K for the stem J on the bottom of the disc, amply provides against an uneven bearing.

While particularly adapted for Revenue Cutter Service, these valves are not confined to this particular use, and we furnish quite a number of them for large plants where high pressures are used. All of our valves undergo a rigid test and careful inspection before being sent out of the factory. The stuffing boxes are packed and the valves are ready for immediate use.

For Revenue Cutter Service these valves are made with three different types of flanges, which we term our "R, S and T" types, and which we guarantee for pressures up to 100, 150 and 200 pounds per square inch respectively, and are made in sizes $1\frac{1}{2}$ to 10 inches inclusive. These valves can also be had with American, English or U. S. Navy Standard flanges, or with flanges of the same diameter as American Extra Heavy Standard. When ordering be sure to specify what style of flange is desired.

Prices and dimensions of the above will be furnished on application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER NEEDLE VALVES.

BRASS.

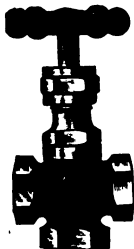


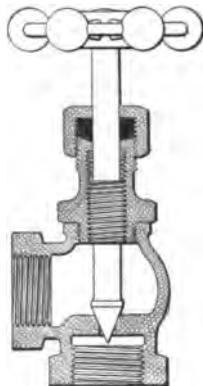
Fig. 906.
Cross Valve.



Fig. 908.
Globe Valve.



Fig. 907.
Angle Valve.



Sectional View.

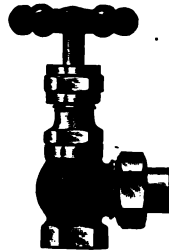


Fig. 910.
Angle Valve with
Union.

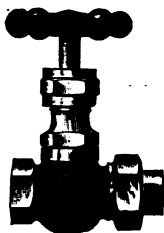


Fig. 909.
Globe Valve
with Union.

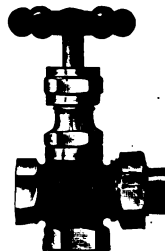


Fig. 911.
Cross Valve with
Union.

We illustrate above a line of Needle Valves which we claim are superior in construction to the common kinds with which the market is flooded.

We use only the very best grade of bronze composition. The valve is heavy in weight and a strong and durable device is insured.

The seat bearing is accurately machined and the valve is guaranteed to give satisfaction. Owing to the long tapering seat bearing and fine pitch of threads on stem, the valve can be regulated to as fine a degree of opening as desired.

They are supplied with either steel or brass stems, and when ordering be sure to specify which style is wanted. When not otherwise ordered, valves with brass stems will always be furnished.

Lunkenheimer Needle Valves—Continued.

PRICE LIST.

Size.....Inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Steel Stem, Globe or Angle, rough body, finished trimmings, female ends.....each	60	70	80	1 45	1 85
Steel Stem, Cross Valve, rough body, finished trimmings, female ends.....each	90	1 20	1 45	2 25	2 80
Steel Stem, Globe or Angle, finished all over, finished brass wheel, female ends.....each	95	1 05	1 20	2 00	2 65
Steel Stem, Cross Valve, finished all over, finished brass wheel, female ends.....each	1 35	1 80	2 15	3 10	3 90
Steel Stem, Globe or Angle, rough body, finished trimmings, female union on one end.....each	75	95	1 10	1 75	2 50
Steel Stem, Cross Valve, rough body, finished trimmings, female union on one end.....each	1 05	1 55	1 75	2 55	3 45
Steel Stem, Globe or Angle, finished all over, finished brass wheel, female union on one end.....each	1 15	1 30	1 45	2 40	3 15
Steel Stem, Cross Valve, finished all over, finished brass wheel, female union on one end.....each	1 55	2 05	2 40	3 50	4 65
Brass Stem, Globe or Angle, rough body, finished trimmings, female ends.....each	65	75	85	1 60	2 00
Brass Stem, Cross Valve, rough body, finished trimmings, female ends.....each	95	1 25	1 50	2 40	3 00
Brass Stem, Globe or Angle, finished all over, finished brass wheel, female ends.....each	1 00	1 10	1 25	2 25	2 90
Brass Stem, Cross Valve, finished all over, finished brass wheel, female ends.....each	1 40	1 90	2 25	3 40	4 20
Brass Stem, Globe or Angle, rough body, finished trimmings, female union on one end.....each	80	95	1 15	1 95	3 10
Brass Stem, Cross Valve, rough body, finished trimmings, female union on one end.....each	1 10	1 45	1 75	2 75	4 10
Brass Stem, Globe or Angle, finished all over, finished brass wheel, female union on one end.....each	1 20	1 35	1 50	2 60	3 50
Brass Stem, Cross Valve, finished all over, finished brass wheel, female union on one end.....each	1 60	2 15	2 50	3 10	4 70
Seat Openings in Valves with Brass Stems.....Inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Seat Openings in Valves with Steel Stems.....Inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$

Dimensions furnished on application.

All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER REGRINDING RADIATOR VALVES.



Fig. 420.
Female Ends.



Lock-shield.



Fig. 421.
Male and Female Ends.

The principles of construction of the Lunkenheimer Regrinding Radiator Valves are the same as our Regrinding Valves, described and illustrated on pages 29 to 31.

These valves are very neat in appearance, and are practical and durable in construction, perfect satisfaction being guaranteed.

The above can be reground when the seat is worn, the directions for which are given on page 31. They are far more reliable than Composition Disc Valves and do not cost as much.

Our valves can also be packed under pressure, which is a very important and necessary feature for valves used on radiators which are usually under pressure both night and day.

The ends of stems on Lock-shield Valves are triangular in cross-section, hence they comply with Navy requirements, and can only be opened with special key.

They are provided with either patent "Unbreakable" Wood Handles, Lock-shield or T-handle, at the same price, and can be had with female screw ends or male and female ends, as desired.

PRICE LIST.

Wood Wheel, T-Handle or Lock-shield.

Size.....inches	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2
Fig. 420, Rough Body.....each	90	1 05	1 35	1 60	2 25	3 25	4 50	7 00
Fig. 420, Rough Body, Nickel Plated Trimmings.....each	1 10	1 25	1 55	1 85	2 50	3 50	4 80	7 50
Fig. 420, Rough Body, Nickel Plated all over.....each	1 20	1 35	1 65	1 95	2 65	3 70	5 00	7 75
Fig. 420, Finished Body.....each	1 40	1 55	1 85	2 15	2 85	4 00	5 50	8 50
Fig. 420, Finished Body, Nickel Plated all over.....each	1 70	1 85	2 15	2 50	3 25	4 45	6 00	9 25
Fig. 421, Rough Body.....each	1 00	1 15	1 45	1 70	2 35	3 35	4 60	7 10
Fig. 421, Rough Body, Nickel Plated Trimmings.....each	1 20	1 35	1 65	1 95	2 60	3 60	4 90	7 60
Fig. 421, Rough Body, Nickel Plated all over.....each	1 30	1 45	1 75	2 05	2 75	3 80	5 10	7 85
Fig. 421, Finished Body.....each	1 50	1 65	1 95	2 25	2 95	4 10	5 60	8 60
Fig. 421, Finished Body, Nickel Plated all over.....each	1 80	1 90	2 25	2 60	3 35	4 55	6 10	9 35

Keys for Lock-shield Valves, 12 cents each net extra per valve.

When ordering Radiator Valves, always designate Threads, Style and Finish; also, if wanted with Wood Wheel, T-handle or Lock-shield. Unless otherwise specified, valves will be sent with Wood Wheels.

If a quantity of Radiator Valves with Lock-shield are ordered, be sure to distinctly specify the number of keys wanted.

LUNKENHEIMER
REGRINDING RADIATOR VALVES.

With Union.



Fig. 422.

With Union.

At the same price, these valves can be had with either patent "Unbreakable" Wood Wheel, Lock-shield or T-handle. The ends of stems on Lock-shield Valves are triangular in cross-section, hence they comply with Navy requirements, and can only be opened with special key.

PRICE LIST.

Wood Wheel, T Handle or Lock Shield.

Size,.....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Fig. 422, Rough Body, with Union, .. each	1 50	1 75	2 05	2 45	3 25	4 50	6 50	10 00
Fig. 422, Rough Body, Nickel Plated Trimmings, with Union,..... each	1 60	1 90	2 30	2 75	3 50	4 85	6 90	10 50
Fig. 422, Rough Body, Nickel Plated all over, with Union,.....each	1 70	2 00	2 40	2 85	3 65	5 05	7 10	10 85
Fig. 422, Finished Body, with Union, each	1 80	2 10	2 55	3 00	3 85	5 25	7 50	11 50
Fig. 422, Finished Body, Nickel Plated all over, with Union,.....each	2 00	2 30	2 90	3 40	4 30	5 80	8 10	12 35

Keys for Lock-shield Valves, 12 cents each net extra per valve.

When ordering Radiator Valves, always designate Threads, Style and Finish, also if wanted with wood wheel, T-handle or Lock-shield. Unless otherwise specified valves will be sent with Wood Wheels.

If a quantity of Radiator Valves with Lock-shield are ordered, be sure to distinctly specify the number of keys wanted.

LUNKENHEIMER MEDIUM PATTERN REGRINDING CHECK VALVES.

Screw Ends.

BRASS.



Fig. 414.
Horizontal Check Valve.



Fig. 415.
Angle Check Valve.



Fig. 418.
Vertical Check Valve.

In designing the Lunkenheimer Regrinding Check Valves we have very carefully considered every slight detail, to the end that we can safely say, more durable, reliable and practical valves cannot be had.

The principal objection in valves of this kind is the excessive pounding, and consequently the quick wearing of the disc and seat. We feel confident that we have overcome this objection by the practical construction of the disc C, which the sectional view above clearly illustrates.

It has wing guides, cut away in the center, thereby making the disc very light, but not in the least sacrificing the strength of same. By thus making the disc as light as is consistent with strength we have gained that which no other manufacturer of similar articles can claim, viz.: less pounding, a perfectly tight valve, one that will at all times properly seat itself, no sticking and minimum amount of wear. The valves can easily be reground when worn, and there being but few parts they cannot get out of order.

The above, being our Medium Pattern, are guaranteed for working pressures up to 200 pounds. The Horizontal and Angle Check Valves are furnished with hexagon caps up to and including the 2-inch size, above which they are furnished with slotted caps, though either hexagon or slotted caps for any size can be had at the same price. English instead of American Standard pipe threads are furnished when so ordered. When valves with enlarged seat openings are wanted, the diameter of the seat opening is made the same as that of the next larger size valve.

PRICE LIST.

Size..... inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Check Valves, Horizontal, Angle or Vertical, Rough...ea.	50	50	60	85	1 15	1 55	2 30	3 25	5 20	10 00	14 00	19 75	30 75
Check Valves, Horizontal, Angle or Vertical, Finished, ea.	75	75	90	1 30	1 75	2 40	3 50	5 00	7 80	12 50	17 50	25 00	37 00
Check Valves, Horizontal, Enlarged Seats, Fig. 314.....each				1 15	1 55	2 30	3 25	5 20	10 00				
Check Valves, with Drain Cocks, Fig. 316.....each			1 05	1 30	1 60	2 00	2 75	3 70	5 65	10 50	14 50		
Check Valves, Enlarged Seats, with Drain Cocks, Fig. 315...ea.				1 60	2 00	2 75	3 70	5 65	10 50				

See page 37 for price list of repairs.

For general dimensions see page 396.

All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER MEDIUM PATTERN REGRINDING CHECK VALVES.

Flange Ends.

BRASS.



Fig. 583.
Vertical Check Valve.



Fig. 583.
Horizontal Check Valve.



Fig. 584.
Angle Check Valve.

The above are warranted to stand a working pressure of 200 pounds. They can be furnished with either round slotted, or hexagon caps for any size, without extra charge. Hexagon caps will always be sent for sizes from $\frac{3}{8}$ to 2 inches inclusive, above which slotted caps are furnished, unless otherwise specified. The description on page 54 fully details the principles of construction of these valves. Navy Standard Flanges are furnished at a special discount from price list below, and we are also prepared to furnish English instead of American Standard Flanges when so ordered.

PRICE LIST.

Size.....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	
Horiz. Check Valves, Flange Ends.....each	1 90	3 00	4 30	5 20	7 30	9 70	13 30	18 20	25 80	32 90	46 00
Angle Check Valves Flange Ends.....each	1 90	3 00	4 30	5 20	7 30	9 70	13 30	18 20	25 80	32 90	46 00
Vertical Check Valves, Flange Ends.....each	1 90	3 00	4 30	5 20	7 30	9 70	13 30	18 20	25 80	32 90	46 00

For general dimensions see list on page 396.

All genuine valves have the name LUNKENHEIMER cast in valve shell.

LUNKENHEIMER
EXTRA HEAVY PATTERN REGRINDING CHECK
VALVES.

Screw Ends.

BRASS.



Fig. 622.
Vertical Check Valve.



Fig. 413.
Horizontal Check Valve.



Fig. 621.
Angle Check Valve.

The principles of construction of the above are identical to those on page 54, but these, being our Extra Heavy Pattern, are guaranteed for 300 pounds pressure. Hexagon caps are furnished for sizes $\frac{1}{4}$ to 2 inches inclusive, above which the valves are sent with round slotted caps, though hexagon or slotted caps can be had for any size at the same price. English instead of American Standard pipe threads are furnished when so ordered.

The above are used wherever heavy pressures are carried and a first-class article is desired, and are extensively used on Navy vessels, ocean, lake and river steamers, locomotives, etc.

PRICE LIST.

Size..... inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Horizontal Check Valves, Screw Ends, .....each	70	70	1 00	1 70	2 80	3 90	5 50	8 90	16 20	24 30	35 40	45 20
Angle Check Valves, Screw Ends, .....each	70	70	1 00	1 70	2 80	3 90	5 50	8 90	16 20	24 30	35 40	45 20
Vertical Check Valves, Screw Ends, .....each	70	70	1 00	1 70	2 80	3 90	5 50	8 90	16 20	24 30	35 40	45 20

For general dimensions see list on page 397.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
EXTRA HEAVY PATTERN REGRINDING CHECK
VALVES.

Flange Ends.

BRASS.



Fig. 586. Vertical Check Valve.



Fig. 558.
Horizontal Check Valve.



Fig. 587.
Angle Check Valve.

Our Extra Heavy Pattern Regrinding Check Valves are suitable for working pressures up to 300 pounds. Hexagon caps are furnished on valves from $\frac{3}{4}$ to 2 inches inclusive, above which sizes round slotted caps are supplied, though either hexagon or slotted caps can be had at the same price. Valves can be furnished with Navy Standard Flanges at a special discount from the list below. They can also be had with flanges of the same diameter as Extra Heavy American Standard. See page 54 for a complete description of the above.

PRICE LIST.

Size .....inches	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4
Horizontal Check Valves, Flange Ends .....each	2 20	3 70	5 20	6 80	9 40	12 70	18 10	29 00	39 10	52 80	65 20
Angle Check Valves, Flange Ends .....each	2 20	3 70	5 20	6 80	9 40	12 70	18 10	29 00	39 10	52 80	65 20
Vertical Check Valves, Flange Ends .....each	2 20	3 70	5 20	6 80	9 40	12 70	18 10	29 00	39 10	52 80	65 20

For general dimensions see list on page 397.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
**MEDIUM AND EXTRA HEAVY PATTERN REGRIND-
ING CHECK VALVES.**

"Special" Screw and Flange Ends.

BRASS.



Fig. 686.
Medium Pattern Horizontal Check Valve
with Screw and Flange Ends.



Fig. 687.
Medium Pattern Angle Check Valve
with Screw and Flange Ends.

For special requirements, and for 200 and 300 pounds working pressure, we can furnish our Medium or Extra Heavy Pattern Regrinding Check Valves with screw and flange ends. Round slotted caps instead of hexagon caps can be had without extra charge, though hexagon caps will be sent for sizes $\frac{3}{4}$ to 2 inches inclusive, and above 2 inches with slotted caps, unless otherwise specified. See page 54 for a complete description.

These valves are also furnished with Navy Standard Flange at a special discount from price list below.

When ordering be sure to specify whether the inlet or outlet end is to be flanged.

PRICE LIST.

Size.....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Medium Pattern Horizontal Check Valves, Screw and Flange Ends, Fig. 686.....each	1 70	2 50	3 40	4 30	6 00	8 00	11 10	17 20	24 00	33 40	45 40
Medium Pattern Angle Check Valves, Screw and Flange Ends, Fig. 687.....each	1 70	2 50	3 40	4 30	6 00	8 00	11 10	17 20	24 00	33 40	45 40
Extra Heavy Pattern Horizontal Check Valves, Screw and Flange Ends, Fig. 822.....each	2 00	3 00	4 40	6 00	8 40	11 30	16 50	27 20	37 90	52 80	65 90
Extra Heavy Pattern Angle Check Valves, Screw and Flange Ends, Fig. 823.....each	2 00	3 00	4 40	6 00	8 40	11 30	16 50	27 20	37 90	52 80	65 90

Valves with radial instead of flat-faced flange will be charged at higher prices than above list. When ordering always send sketch of exactly what is wanted; also radius of flange. The above lists are for valves with regular flange on one end and other end with female thread; but if male thread is desired on screw end, or blank stud in addition to flange, there will be an extra charge.

For dimensions see lists on pages 396 and 397.

All genuine valves have the name LUNKENHEIMER cast in body.

LUNKENHEIMER
MEDIUM PATTERN BALL CHECK VALVES.

Screw Ends.

BRASS



Fig. 416.
Horizontal Ball
Check Valve.



Fig. 739.
Angle Ball
Check Valve.



Fig. 740.
Vertical Ball
Check Valve.

Our Medium Pattern Ball Check Valves, illustrated above, are guaranteed to stand a working pressure of 200 pounds per square inch. These valves are well finished, the ball checks are perfectly true and will not stick, pound or leak. By means of the guide wings on the cap they will at all times properly seat themselves, and by a number of users they are preferred to the other forms of check valves.

The valves are made of the very best grade of bronze composition; they are rigidly tested and inspected before shipment, and we guarantee them to give perfect satisfaction in every respect. We are prepared to furnish extra Brass Check Balls at a reasonable price. See page 289 for price list.

PRICE LIST.

Size, .....inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Horizontal, Angle or Vertical, Brass Ball Check Valves, each	85	95	1 10	1 60	2 30	3 10	4 00	6 20	9 40	18 00	25 00
Horizontal Brass Ball Check Valves with Drain Cock, Fig. 327, .....each	.....	.....	1 50	2 00	2 70	3 50	4 40	6 60	9 80	18 50	25 50

*All genuine valves have the name LUNKENHEIMER cast in the body.
For general dimensions see page 398.*

LUNKENHEIMER
REGRINDING SWING CHECK VALVES.

BRASS.



Sectional View.



Top View.

The Lunkenheimier Regrinding Swing Check Valve is much superior in point of excellence of material, design and workmanship to any other valve of its class now upon the market. The body is heavy and well proportioned, the seat is carefully finished and the general workmanship is first class. This valve is so designed that when the disc is raised the passage through the body is fully equal to the diameter of the connecting pipes. It can be used in either a horizontal or vertical position.

We call particular attention to the quality of metal used, it being the best gun metal composition, the presence of which tends to make the valve more durable than if a common metal (such as other makers are using) was used.

A very important feature in the design of our valves is the use of the two side plugs, which act as a bearing for the pin in the disc carrier. By means of these plugs we are enabled to accurately locate the position of the disc, thereby insuring a full and even bearing between the disc and its seat. Should the plugs become worn by the constant friction of the pin, they can be easily removed and new ones applied at a small cost.

This is not possible on other makes of swing check valves, where but one plug is employed to enable the insertion of the swing check carrier pin. One end of this pin consequently bears in a drilled hole in the body, which constant wear will necessarily make oblong in shape, thereby throwing the disc to one side and causing the valve to leak beyond repair. The entire valve must therefore be discarded and a new one substituted. In the Lunkenheimier Valve all wearing parts can be renewed, thereby saving the valve body.

Where the valve is in an inaccessible place, as in a pipe located against a wall, the plugs being on both sides of valve always permit of access to disc.

By means of the regrinding feature the usefulness of the valve can be prolonged indefinitely. When worn in the seat it can be reground without removing valve body from connecting pipes.

TO REGRIND—Unscrew cap of valve and place some powdered sand and soap on seat; also unscrew plug opposite disc, which will give access to the top of the disc, and by inserting a nail or pointed tool in hole in same, the disc can be ground upon its seat, thus forming a new bearing. Should the disc become badly worn or cut, it can be rubbed down to a smooth surface on a piece of fine emery cloth, or we can furnish new ones at a reasonable price. All parts of this valve are interchangeable, and any worn out piece can be renewed.

The regular pattern is guaranteed to stand a working pressure of 150 pounds, but we also make a line of extra heavy valves of this kind to stand pressures up to 250 pounds. If desired, the valves can be had with cleaning plug or drain cock. Prices on application.

All genuine valves have LUNKENHEIMER cast in the valve shell.

LUNKENHEIMER
REGRINDING SWING CHECK VALVES.

Medium Pattern.

Screw, Flange, or Screw and Flange Ends.

BRASS.



Fig. 554. Screw Ends.



Fig. 556. Flange Ends.



Fig. 623. Screw and Flange Ends

See preceding page for description of the above. These valves, being our medium pattern, are guaranteed for working pressures up to 150 pounds. For special requirements we can furnish our Screw and Flange End Swing Check Valve, and, while cut above illustrates the flange on the inlet end, same can be placed on the outlet end if desired. At a special discount from prices below we can furnish these valves with Navy Standard flanges. English, instead of American Standard threads and flanges, can be had if desired.

PRICE LIST.

Size.....Inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Brass, Screw Ends, Fig. 554.....each	1 25	1 25	1 30	1 75	2 25	3 25	4 25	6 25	11 50	16 00
Brass, Screw and Flange Ends, Fig. 623.....each	2 00	2 20	2 80	3 80	5 50	7 00	9 70	15 50	22 20	
Brass, Flange Ends, Fig. 556.....each	2 60	2 90	3 60	4 90	7 20	9 20	12 30	18 50	26 80	

For general dimensions see list on page 399.

All genuine valves have LUNKENHEIMER cast on the valve shell.

LUNKENHEIMER
REGROUNDING SWING CHECK VALVES.

Extra Heavy Pattern.

Screw, Flange, or Screw and Flange Ends.

BRASS.



Fig. 624. Screw Ends.



Fig. 625. Flange Ends.



Fig. 626. Screw and Flange Ends.

These valves are similar in construction to those on preceding page, but are our Extra Heavy Pattern, and are intended for working pressures up to 250 pounds. English instead of American Standard threads and flanges can be had if desired. At a special discount from price list below Navy Standard flanges will be furnished, or flanges of the same diameter as U. S. Extra Heavy Standard.

Reference can be had to page 60 for a full description of the above.

PRICE LIST.

Size.....Inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Brass, Screw Ends, Fig. 624.....each	2 00	2 10	2 20	2 90	4 00	5 60	7 50	11 00	18 30	28 30
Brass, Screw and Flange Ends, Fig. 626..ea.	.....	2 90	3 20	4 00	5 50	7 80	10 40	14 30	22 30	32 80
Brass, Flange Ends, Fig. 625.....each	.....	3 40	4 00	4 90	6 60	9 50	12 50	16 80	25 30	37 00

For general dimensions see list on page 400.

All genuine valves have LUNKENHEIMER cast on the valve shell.

LUNKENHEIMER
BUTTERFLY VALVES.

Brass, and Iron Body Brass Mounted.



Fig. 572.
Brass.



Fig. 736.
Iron Body Brass Mounted.

The above are principally used as regulating valves for air, steam, water or gas, and as they are balanced valves, they can consequently be operated very easily.

These valves are strictly in keeping with our other high grade products as regards workmanship and material, and are carefully inspected and tested before leaving the factory. They are guaranteed for working pressures up to 150 pounds per square inch.

Both patterns have large steel stems, with bronze stuffing-boxes and discs, making same very strong and durable.

If desired, these valves can be furnished with operating lever on the stem, but a special charge will be made for same. English instead of American Standard Pipe Threads will be furnished when so ordered.

PRICE LIST.

Size..... inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Brass, Screw Ends.....each	3 10	4 40	5 65	6 75	10 00	13 75	21 00
Iron Body, Screw Ends.....each				7 00	8 00	9 50	12 00

All genuine valves have LUNKENHEIMER cast on the body.

LUNKENHEIMER GLOBE, ANGLE AND CROSS VALVES WITHOUT YOKE.

Iron Body Brass Mounted—Extra Quality.

Screw Ends.

For 125 Pounds Working Pressure.



**Fig. 435.
Globe Valve.**



**Fig. 826.
Cross Valve.**



**Fig. 563.
Angle Valve.**

For low-priced, though substantially and durably constructed, and for working pressures not exceeding 125 pounds per square inch, we recommend our Iron Body Brass Mounted Valves without Yoke, as shown above.

The body is made of a superior grade of hard, close-grained iron, while the trimmings, with the exception of the hand wheel, which is also of iron, are of a high-grade bronze composition, the whole construction being such that the valves will readily withstand long and severe usage.

The above can be reground. The stuffing box can be packed while the pressure is on and the valve wide open.

PRICE LIST.

Size, .....Inches	1	1½	1¾	2	2½	3
Globe Valves, Screw Ends, .....each	2 25	2 75	3 50	5 40	7 35	9 80
Angle Valves, Screw Ends, .....each	2 25	2 75	3 50	5 40	7 35	9 80
Cross Valves, Screw Ends, .....each	2 70	3 30	4 20	6 50	9 00	12 50

For general dimensions see list on page 401

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES WITHOUT YOKE.

Iron Body Brass Mounted. Extra Quality.

Flange Ends.

For 125 Pounds Working Pressure.



Fig. 564.
Globe Valve.



Fig. 827.
Cross Valve.



Fig. 565.
Angle Valve.

These valves are the same as those shown on opposite page, with the exception that they have flanged instead of screwed ends. They are guaranteed for working pressures up to 125 pounds. English instead of American Standard flanges are furnished when so ordered.

PRICE LIST.

Size, inches	1	1½	1½	2	2½	3
Globe Valves, Flange Ends,.....each	3 25	3 85	4 80	7 00	9 00	12 50
Angle Valves, Flange Ends,.....each	3 25	3 85	4 80	7 00	9 00	12 50
Cross Valves, Flange Ends,.....each	3 90	4 65	5 75	9 00	12 00	16 50

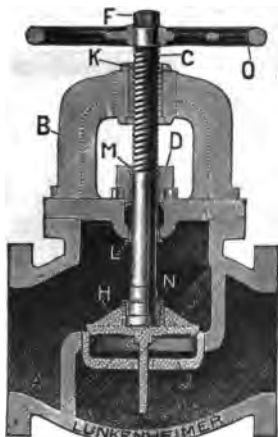
For general dimensions see list on page 401.

All genuine valves have the name LUNKENHEIMER cast on the body.

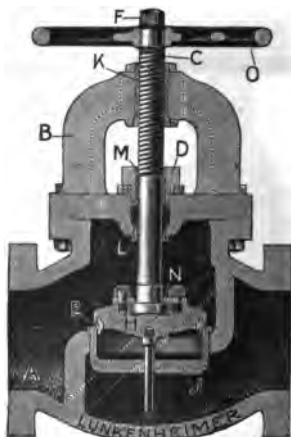
LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Iron Body Brass Mounted.

Outside Screw and Yoke.



Sectional View.
Medium Pattern Globe Valve.



Sectional View.
Extra Heavy Pattern Globe Valve.

To comply with the increasing demand for Iron Body Valves, suitable for various pressures up to certain limits, we have carefully designed a full line of Medium, Heavy and Extra Heavy Patterns for working pressures up to 125, 150 and 250 pounds per square inch, respectively. We are prepared to furnish promptly any of the Iron Body Valves listed on the following pages, and guarantee them to fulfill in every respect all that we claim for them.

As to the material, special care has been exercised in the selection of the composition, elaborate tests having been made to determine a grade that combined both strength and durability, the result being that the valves will readily withstand long and severe usage. We can safely assure the trade that a better designed valve cannot be had, the details of construction having been singly and collectively considered.

It will be found upon inspection that the pipe threads of the Screw End Valves are long, full and perfect, which insures a strong and safe connection, even though the threads on the pipe be cut a trifle longer than the standard length. There is also ample clearance between the ends of the threads and the walls of the diaphragm.

The stems C are made of rolled Tobin Bronze, a material having nearly the tensile strength of steel. The threads thereon engage those in the bronze bushing K in the top of the yoke B, and the bushings M and L in the stuffing boxes and glands also offer non-corrosive, renewable bearing surfaces for the stems. Owing to this improved construction, combined with the properly proportioned hand wheels O, the force necessary to operate the valves is reduced to a minimum.

Iron Body Brass Mounted Globe, Angle and Cross Valves—Continued.

The yokes and hubs are very strong and rigid, and on the Medium Pattern Valves they are firmly held in place by large steel studs and nuts, while on the Extra Heavy Pattern, which is intended for high pressures, the yokes are secured by means of steel bolts instead of studs, the nuts and bolt heads of which seat on finished surfaces, as do also the nuts for the studs on the Medium Pattern Valves.

An important feature in the design of a valve is the areas through the body, and in this particular liberal allowance has been made in the construction of our valves. At no point are they cramped, or will they obstruct the free flow of steam or water, the areas being largely in excess of the nominal diameters of the connecting pipes.

Another desirable feature in the design of our valves is the fact that they can be packed while the pressure is on and the valve wide open, a perfect seat being formed between a shoulder on the stem and the bottom of the bushing L.

The discs in our Medium Pattern Valves, up to the 8-inch size inclusive, and the Extra Heavy Pattern up to the 6-inch size inclusive, are made entirely of bronze, as shown in the sectional view of the Medium Pattern Valve on the opposite page. The larger sizes, however, are constructed as shown in the sectional view of the Extra Heavy Pattern Valve, also illustrated on the opposite page, and to which we call particular attention. The body of the disc is made of a very hard and close-grained iron, which will safely undergo considerable strain. Forced in a groove, which is cut at an angle, is the bronze disc seat E, and this method of retaining same is decidedly superior to any other method known, as there is absolutely no liability of its becoming loose or detached from the disc body. The disc ring E is provided with a projecting flange on the bottom thereof, which snugly fits the inside of the valve seat ring.

The object of this flange is threefold. Its principal function is the preservation of the seat, inasmuch as when the disc is about to close the tremendous and damaging velocity of the steam rushing past the seat is greatly reduced by the close contact of this flange with the inside of the seat, which causes the force of the steam to expend itself before it reaches the seat bearing. This feature is very important as regards the life of the seat, especially if the valve should accidentally be left partly open, in which event, if some provision of this kind were not made, the wear would be damaging. Another function which this flange performs is the prevention of water-hammer, which is caused by the sudden admission of steam, for it will readily be seen that no matter how quickly the hand wheel may be operated, the flange will only permit the steam to enter gradually. Still another feature is the cleansing of the seat, accomplished by the fine spray of steam (entirely free from foreign matter) which escapes around this flange as it enters the seat ring.

The disc is securely held to the stem C by means of the flange N, which is attached to the disc by large steel studs and nuts. By means of the rolled Tobin Bronze guide stem, which is screwed into the bottom of the disc, coupled with the stem C, the disc is well guided and will properly seat itself.

All of the wearing parts can easily be renewed should they become worn or broken, and hence the valve is very durable. Should the seat become worn the same can quickly and easily be reground.

These valves are rigidly tested and carefully inspected before they are permitted to leave the factory, and we guarantee them to give perfect satisfaction.

We are prepared to furnish same with English Standard pipe threads or flanges, or with tongued and grooved flanges, if desired. Our Extra Heavy Pattern Valves can be had of semi-steel, the tensile strength of which is over 30,000 pounds.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Medium Pattern. Iron Body Brass Mounted.

With Outside Screw and Yoke. Screw Ends.

For 125 Pounds Working Pressure.

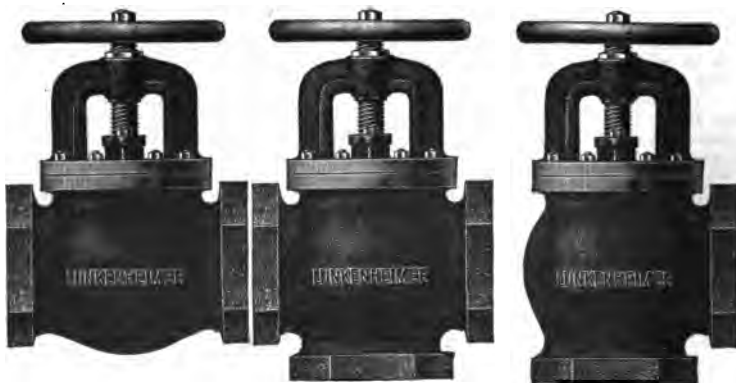


Fig. 276.
Globe Valve.

Fig. 328.
Cross Valve.

Fig. 251.
Angle Valve.

For a complete description of the above see pages 66 and 67. These valves are made with bronze discs up to and including 8 inches, above which the discs are made of iron with bronze rings.

If desired, these valves can be had with English Standard pipe threads instead of American Standard.

PRICE LIST.

Size.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Medium Pattern Globe Valves, Screw Ends...each	7 00	9 00	12 50	15 25	19 00	24 00	27 00	37 50	50 63	00 72	00 114	00 170 00
Medium Pattern Angle Valves, Screw Ends...each	7 00	9 00	12 50	15 25	19 00	24 00	27 00	37 50	50 63	00 72	00 114	00 170 00
Medium Pattern Cross Valve, Screw Ends...each	8 50	11 75	16 25	20 00	23 50	30 35	25 47	25 78	00 92	00 162	00 240 00	

For general dimensions see page 402.

All genuine valves have the name LUNKENHEIMER cast on the valve shell.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Medium Pattern. Iron Body Brass Mounted.

Outside Screw and Yoke. Flange Ends.

For 125 Pounds Working Pressure.



Fig. 928.
Globe Valve.

Fig. 829.
Cross Valve.

Fig. 929.
Angle Valve.

See pages 66 and 67 for a description of the above.

Our Medium Pattern Iron Body Brass Mounted Globe, Angle and Cross Valves, when so ordered, are furnished with English instead of American Standard Flanges.

PRICE LIST.

Size..... inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Medium Pattern Globe Valves, Flange Ends..... each	8 60	10 75	15 00	18 50	22 50	27 50	31 00	42 00	68 00	77 00	123 00	187 00
Medium Pattern Angle Valves, Flange Ends..... each	8 60	10 75	15 00	18 50	22 50	27 50	31 00	42 00	68 00	77 00	123 00	187 00
Medium Pattern Cross Valves, Flange Ends..... each	11 00	14 50	20 00	25 00	28 50	36 00	41 00	54 00	85 00	100 00	175 00	265 00

For dimensions see list on page 402.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Heavy Pattern. Iron Body Brass Mounted.

Outside Screw and Yoke. Screw Ends.

For 150 Pounds Working Pressure.

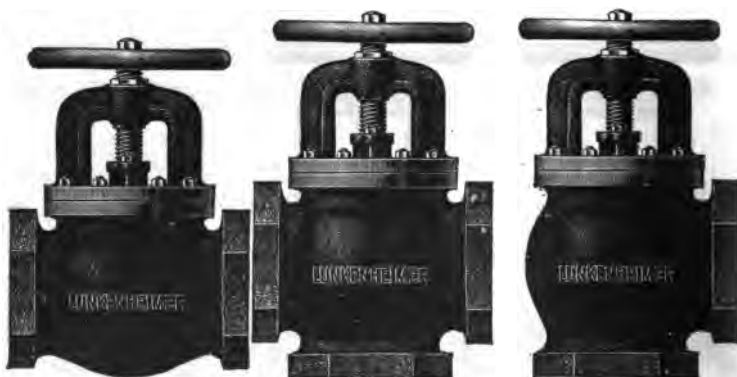


Fig. 436.
Globe Valve.

Fig. 220.
Cross Valve.

Fig. 566.
Angle Valve.

These valves being our Heavy Pattern are fully guaranteed for 150 pounds working pressure.

They can be furnished with English instead of American Standard Pipe Threads, if desired.

A full and complete description together with sectional views of the above can be had by reference to pages 66 and 67.

PRICE LIST.

Size,..... inch	2	2½	3	3½	4	4½	5	6	7	8	10	12
Heavy Pattern Globe Valves, Screw Ends, ..ca.	7 00	9 00	12 50	15 25	19 00	24 00	27 00	37 50	63 00	72 00	114 00	170 00
Heavy Pattern Angle Valves, Screw Ends, ..ca.	7 00	9 00	12 50	15 25	19 00	24 00	27 00	37 50	63 00	72 00	114 00	170 00
Heavy Pattern Cross Valves, Screw Ends, ..ca.	8 50	11 75	16 25	20 00	23 50	30 65	35 25	47 25	78 00	92 00	162 00	240 00

For general dimensions see list on page 403.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Heavy Pattern. Iron Body Brass Mounted.

Outside Screw and Yoke. Flange Ends.

For 150 Pounds Working Pressure.



Fig. 567.
Globe Valve

Fig. 930.
Cross Valve

Fig. 568.
Angle Valve

These valves are similar to those shown on preceding page, with the exception that they are furnished with flange instead of screw ends. They are fully guaranteed to stand working pressures up to 150 pounds per square inch.

For a complete description see pages 66 and 67.

Tongued and grooved, or male and female body flanges, with companion flanges to match, can be had if desired. See page 255 for price list of companion flanges.

PRICE LIST.

Size.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Heavy Pattern Globe Valves, Flange Ends..... each	11 00	13 50	18 00	22 00	26 00	32 00	36 00	48 00	75 00	85 00	130 00	200 00
Heavy Pattern Angle Valves, Flange Ends..... each	11 00	13 50	18 00	22 00	26 00	32 00	36 00	48 00	75 00	85 00	130 00	200 00
Heavy Pattern Cross Valves, Flange Ends..... each	14 50	18 50	24 50	30 00	34 00	42 00	48 00	63 00	95 00	110 00	190 00	280 00

For general dimensions see list on page 403.

None genuine without the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Extra Heavy Pattern, Iron Body Brass Mounted.

With Outside Screw and Yoke. Screw Ends.

For 250 Pounds Working Pressure.

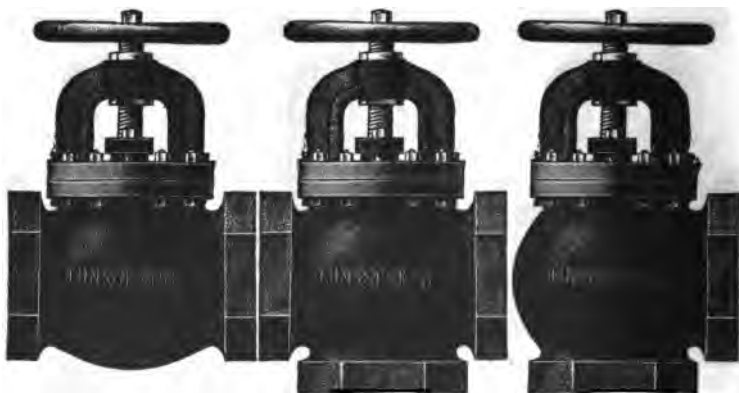


Fig. 881.
Globe Valve

Fig. 883.
Cross Valve

Fig. 882.
Angle Valve

See pages 66 and 67 for a description of these valves. The above are made with bronze discs up to and including 6 inches, above which the discs are made of iron with bronze rings.

Our Extra Heavy Valves can be had made of semi-steel, a material having a tensile strength of over 30,000 pounds. Prices on application.

PRICE LIST.

Size.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Extra Heavy Pattern Globe Valves, Screw Ends.....each	29 00	33 00	37 00	42 00	46 00	53 00	61 00	75 00	95 00	114 00	190 00	285 00
Extra Heavy Pattern Angle Valves, Screw Ends.....each	29 00	33 00	37 00	42 00	46 00	53 00	61 00	75 00	95 00	114 00	190 00	285 00
Extra Heavy Pattern Cross Valves, Screw Ends.....each	35 00	40 00	45 00	50 00	55 00	63 00	75 00	95 00	120 00	145 00	240 00	350 00

For general dimensions see list on page 405.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Extra Heavy Pattern. Iron Body Brass Mounted.

With Outside Screw and Yoke. Flange Ends.

For 250 Pounds Working Pressure.

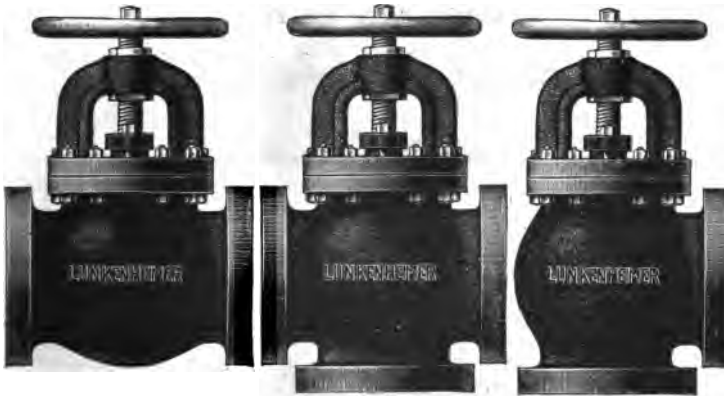


Fig. 884.
Globe Valve.

Fig. 886.
Cross Valve.

Fig. 885.
Angle Valve.

These valves are guaranteed to stand a working pressure of 250 pounds per square inch. They are adapted for use in high-pressure power plants, where a strong, durable and substantial valve is a necessity.

For very severe service, we are prepared to furnish the valves of semi-steel, having a tensile strength of over 30,000 pounds, prices of which will be sent on application.

The above, furnished with tongued and grooved or male and female body flanges with companion flanges to match, can be had if desired. For price list of companion flanges see page 255.

See pages 66 and 67 for a complete description.

PRICE LIST.

Size,.....Inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Extra Heavy Pattern Globe Valves, Flange Ends,.....each	31 00	35 00	40 00	45 00	50 00	57 00	65 00	80 00	100 00	120 00	200 00	300 00
Extra Heavy Pattern Angle Valves, Flange Ends,.....each	31 00	35 00	40 00	45 00	50 00	57 00	65 00	80 00	100 00	120 00	200 00	300 00
Extra Heavy Pattern Cross Valves, Flange Ends,.....each	38 00	43 00	50 00	55 00	60 00	68 00	80 00	100 00	125 00	150 00	250 00	375 00

For general dimensions see list on page 405.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER**EXTRA HEAVY PATTERN
IRON BODY BRASS MOUNTED GLOBE, ANGLE AND
CROSS VALVES WITH BY-PASS.**

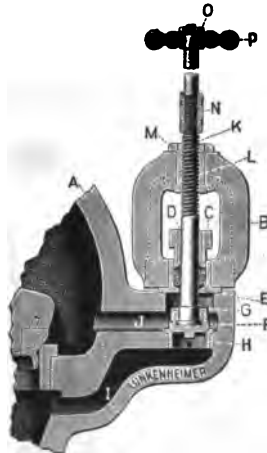
Outside Screw and Yoke.

For 250 Pounds Working Pressure.



On large valves, intended for high pressures, where the total pressure on the bottom of the disc is very great, we are prepared to furnish the same with exterior by-pass.

Unlike a number of other makes which consist of a small valve attached to the main valve by suitable connections, our by-pass is cast integral with the main body, this being a decided advantage, inasmuch as the additional material tends to strengthen the valve body, and a by-pass constructed in this manner is not affected in the least by expansion or contraction.



Detail View of By-Pass Applied to Angle Valve.

The unique manner in which the by-pass yoke is designed is worthy of note. It will be observed by reference to the sectional view above that the bronze stuffing box E is constructed with a flange on the bottom. This flange rests between the heavy iron yoke flange and the body of the by-pass, which prevents corrosion, thereby making it possible at all times to easily take the by-pass apart.

At the top of the yoke B is located the bronze hub M internally threaded for the reception of the thread on the stem K. This is another feature of advantage, for, should the thread in the yoke wear, this bronze bushing M can be easily renewed.

The yoke B is firmly held in place by large steel studs, the nuts of which seat on spot-faced surfaces. As the by-pass is designed with outside screw and yoke, the same is made more durable owing to the fact that the steam does not come in contact with the threads on the stem, and also because of the threads being accessible at all times for oiling.

The by-pass valve can easily be reground when worn, by simply removing the trimmings, placing a little powdered glass, or sand and soap or oil, on the disc, when the seat bearings can again be quickly made tight.

When ordering be sure to specify on what side of the valve body the by-pass is wanted, always considering the inlet flange to the front. These valves can be had made of semi-steel, having a tensile strength of over 30,000 pounds. Prices will be sent on application.

For a complete description of the valve, without by-pass, see pages 66 and 67. *All genuine valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER
EXTRA HEAVY PATTERN
IRON BODY BRASS MOUNTED GLOBE, ANGLE AND
CROSS VALVES WITH BY-PASS.

Outside Screw and Yoke. Screw Ends.

For 250 Pounds Working Pressure.



Fig. 925.
Globe Valve.



Fig. 926.
Angle Valve.

These valves can be had with English instead of American Standard pipe threads, if desired. When ordering be sure to specify on what side of the globe valve body the by-pass is wanted, always considering the inlet end of the valve to the front. The above made of Semi-Steel are furnished when so ordered. Prices on application.

See pages 66, 67, 74 and 75 for complete description.

PRICE LIST.

Size, .....inches	5	6	7	8	10	12
Extra Heavy Pattern Globe Valve, Screw Ends with Outside By-Pass, Fig. 925,.....each	67 00	95 00	125 00	145 00	240 00	340 00
Extra Heavy Pattern Angle Valve, Screw Ends with Outside By-Pass, Fig. 926,.....each	67 00	95 00	125 00	145 00	240 00	340 00
Extra Heavy Pattern Cross Valve, Screw Ends with Outside By-Pass, Fig. 927,.....each	80 00	115 00	150 00	175 00	290 00	410 00

For general dimensions see list on page 405.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
EXTRA HEAVY PATTERN
IRON BODY BRASS MOUNTED GLOBE, ANGLE AND
CROSS VALVES WITH BY-PASS.
Outside Screw and Yoke. Flange Ends.
For 250 Pounds Working Pressure.



Fig. 922.
Globe Valve.



Fig. 923.
Angle Valve.

Tongued and grooved or male and female body flanges with companion flanges to match can be had, instead of plain flanges, if desired. See page 255 for list price of flanges.

When ordering be sure to specify on what side of the globe valve body the by-pass is wanted, either right or left, always considering the inlet end of the valve toward the front. If desired, these valves can be had of Semi-Steel. Prices on application.

See pages 66, 67, 74 and 75 for complete description.

PRICE LIST.

Size, .....inches	5	6	7	8	10	12
Extra Heavy Pattern Globe Valve, Flange Ends with Outside By-Pass, Fig. 922,.....each	70 00	100 00	130 00	150 00	250 00	350 00
Extra Heavy Pattern Angle Valve, Flange Ends with Outside By-Pass, Fig. 923,.....each	70 00	100 00	130 00	150 00	250 00	350 00
Extra Heavy Pattern Cross Valve, Flange Ends with Outside By-Pass, Fig. 924,.....each	85 00	120 00	160 00	180 00	300 00	425 00

For general dimensions see list on page 405.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER GLOBE, ANGLE AND CROSS VALVES.

For Superheated Steam.

Extra Heavy Pattern for 250 Pounds Working Pressure.

Semi-Steel Body Nickel Mounted.

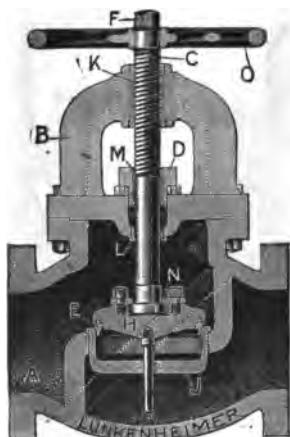


Fig. 271.

Sectional View.

A common and sometimes serious mistake made by users of superheated steam is the use of valves ordinarily intended for low temperatures. In these ordinary valves the disc, seat, and general mountings are of brass, a material whose strength and degree of hardness decreases with the increase of temperature above a certain point, the result being that the valves cannot be kept tight, are not at all satisfactory, and often occasion serious accidents.

To safely withstand these high temperatures, we have designed a line of valves, ranging in size from 2 to 12 inches inclusive, which are guaranteed in every respect for superheated steam and for working pressures not exceeding 250 pounds. The body and yoke of these valves are made of semi-steel, the tensile strength of which is over 30,000 pounds, while such trimmings that are at all subjected to the steam are made of a high-grade mixture of nickel, which materials, as is well known, will safely withstand very high temperatures.

The entire valve is heavily proportioned, and the engineer is sure to be favorably impressed with the strength, rigidity and safety which the massiveness of the valve is sure to impart. The metal in the body is systematically distributed, and such parts subjected to the greatest strain are made heavier in proportion, such, for instance, as the diaphragm and necks of the body, which will be found to be extremely heavy, and all corners are well strengthened by large fillets.

The design of the valve can be ascertained by referring to the illustration above, and its numerous advantages will be appreciated.

Lunkenheimer Semi-Steel Body Nickel Mounted Globe, Angle and Cross Valves—Continued.

An important feature in the construction of our valves is the practical design of the disc H. It is made of iron, is very strong and rigid, and is not at all affected by any excessive pressure that may be applied to the hand wheel. Forced in a groove cut at an angle in this disc H is the nickel disc ring E, a method which we have adopted for securing the ring to the disc, it being far superior to the old method of screwing same on, as there is no liability of the ring ever becoming loose or detached from the disc. This disc ring E is provided with a projecting flange which snugly fits inside the seat ring J.

The object of this flange is threefold. Its principal function is the preservation of the seat, inasmuch as when the disc is about to close the tremendous and damaging velocity of the steam rushing past the seat is greatly reduced by the close contact of this flange with the inside of the seat ring, which causes the force of the steam to expend itself before it reaches the seat. This feature is very important as regards the life of the seat, especially if the valve should accidentally be left partly open, in which event, if some provision of this kind were not made, the wear would be damaging. Another function which this flange performs is the prevention of water-hammer, which is caused by the sudden admission of steam into a length of pipe in which water has accumulated, for it will readily be seen that, no matter how quickly the hand wheel may be operated, the flange will only permit the steam to enter gradually. Still another feature is the cleansing of the seat, accomplished by the fine spray of steam (entirely free from foreign matter) which escapes around this flange as it enters the seat ring.

The stem C is connected to the disc by means of the iron flange N, which is securely held by a number of large steel studs and bronze nuts. The stem C operates within a bronze internally threaded bushing K in the top of the yoke, and also within the non-corrosive stuffing box and gland bushings M and L, and therefore at no time is it possible for the same to become corroded to any part of the valve. Should the threads in the bushing K become worn, the entire bushing can easily and quickly be renewed, which is also true of any other of the wearing parts of the valve.

Unlike other makes of valves intended for high pressures, the yokes are not held to the bodies by means of studs, but we employ large steel bolts, the heads and nuts of which seat on finished surfaces, thereby insuring an even bearing.

Owing to the large diameter of the hand wheel, which is correctly proportioned in respect to the seat opening, no additional leverage is necessary to properly manipulate the valve and secure a tight joint.

Liberal allowance has been made for the free and unobstructed flow of steam through the valve, and at no point is the area cramped, the same being largely in excess of the nominal diameter of the connecting pipes.

These valves can be had with or without by-pass, but we recommend that by-pass be used on all sizes including 5-inch and above. They are also made with screw or flange ends, and, if desired, tongued and grooved body and companion flanges can be furnished.

All valves are thoroughly tested and inspected before they are permitted to leave the factory, and are warranted to be as represented.

Prices on application.

LUNKENHEIMER
IRON BODY BRASS MOUNTED CORNER VALVES.

Medium Pattern.

With Outside Screw and Yoke. Right or Left Hand Patterns.

Screw or Flange Ends.



Fig. 859.
Right Hand Pattern.
Screw Ends.



Fig. 862.
Left Hand Pattern.
Flange Ends.

The principles of construction of the LUNKENHEIMER Iron Body Brass Mounted Corner Valves are identical with those of the Medium Pattern Iron Body Brass Mounted Globe, Angle and Cross Valves, illustrated on pages 68 and 69, and described at length on pages 66 and 67. the only difference being in the design of the body, which is suitable for corner location, as the name implies. See the above-mentioned pages for a description of the many superior points of merit in the construction of the valve. They are made in two patterns, which we term "Right Hand" or "Left Hand", and are distinguished by the inlet being either to the right or left, with the outlet toward the observer.

If desired, these valves can be had with one end flange and the other screw, or English instead of American pipe threads and flanges will be furnished when so ordered.

The above, being our Medium Pattern, are guaranteed for working pressures up to 125 pounds per square inch.

PRICE LIST.

Size,..... inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Right (Fig. 859) or Left Hand (Fig. 861) Patterns, Screw Ends, each	10 00	13 00	17 00	20 00	26 00	29 00	35 00	45 00	75 00	86 00	165 00	250 00
Right (Fig. 860) or Left Hand (Fig. 862) Patterns, Flange Ends, ea.	12 00	16 00	20 00	25 00	31 00	34 00	41 00	53 00	84 00	96 00	190 00	280 00

See Angle Valve dimensions on page 402 for general dimensions of above.
All genuine valves have the name LUNKENHEIMER cast on the valve shell.

LUNKENHEIMER
IRON BODY BRASS MOUNTED CORNER VALVES.

Heavy Pattern.

With Outside Screw and Yoke. Right or Left Hand Pattern.

Screw or Flange Ends.



Fig. 224.
Right Hand Pattern.
Screw Ends.



Fig. 221.
Left Hand Pattern.
Flange Ends.

These valves are similar to those shown on page 80, but, being our Heavy Pattern, are guaranteed for 150 pounds working pressure.

When so ordered, the above are furnished with one end screw and the other end flange. Tongued and grooved or male and female flanges, with companion flanges to match can be had if desired. See page 255 for list prices of flanges.

See pages 66 and 67 for a complete description.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Right (Fig. 224) or Left Hand (Fig. 223) Pattern, Screw Ends, each	10 00	13 00	17 00	20 00	26 00	29 00	35 00	45 00	75 00	86 00	165 00	250 00
Right (Fig. 224) or Left Hand (Fig. 221) Pattern, Flange Ends, each	16 00	19 00	23 50	29 00	35 00	39 00	47 00	60 00	92 00	105 00	205 00	295 00

See Angle Valve dimensions on page 403 for general dimensions of above.

All genuine valves have the name LUNKENHEIMER cast on the valve shell.

LUNKENHEIMER
IRON BODY CHECK VALVES.

Medium Pattern.

For 125 Pounds Working Pressure.

Brass Mounted—Extra Quality.

Horizontal and Angle Patterns. Screw Ends.



Fig. 231.
Horizontal Check Valve.
Screw Ends.



Fig. 230.
Angle Check Valve.
Screw Ends.

Our Iron Body Check Valves are made of the very highest grade of hard, close-grained iron. The seat and disc are made of the very best bronze composition and the workmanship is first class. The cap flange is spot-faced, which affords a better bearing surface for the nuts on the studs that hold the cap to the body. The disc is guided at both top and bottom, and is so designed that it will not stick, leak or pound. The valve can readily be reground without requiring its removal from the pipe. The valves shown above are designed and guaranteed to stand a working pressure of 125 pounds per square inch.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Horizontal Check Valves, Screw Ends,.....each	3 60	6 50	8 90	12 25	14 25	19 00	22 00	30 00	45 00	57 00	105 00	155 00
Angle Check Valves, Screw Ends,.....each	3 60	6 50	8 90	12 25	14 25	19 00	22 00	30 00	45 00	57 00	105 00	155 00

For general dimensions see list on page 406.

All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER
IRON BODY CHECK VALVES.

Medium Pattern.

For 125 Pounds Working Pressure.

Brass Mounted—Extra Quality.

Horizontal and Angle Patterns. Flange Ends.



Fig. 931
Horizontal Check Valve.
Flange Ends.



Fig. 932.
Angle Check Valve.
Flange Ends.

The above are suitable for working pressures up to 125 pounds per square inch. They can readily be reground, should the disc or seat wear, without necessitating their removal from the pipe. The bodies are made of hard, close-grained iron, while the disc and seat are made of the very best bronze composition. The discs are guided at both top and bottom and will not stick, leak or pound.

English instead of American Standard flanges can be had if desired.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Horizontal Check Valves, Flange Ends,.....each	5 25	8 25	11 50	15 50	18 00	22 50	26 00	35 00	50 00	62 00	115 00	175 00
Angle Check Valves, Flange Ends,.....each	5 25	8 25	11 50	15 50	18 00	22 50	26 00	35 00	50 00	62 00	115 00	175 00

See page 406 for general dimensions.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER IRON BODY CHECK VALVES.

Heavy Pattern.

For 150 Pounds Working Pressure

Brass Mounted.—Extra Quality.

Horizontal and Angle Patterns. Screw Ends.



Fig. 437.
Horizontal Check Valve.
Screw Ends.



Fig. 631.
Angle Check Valve.
Screw Ends.

With the exception that the above are considerably heavier in weight they are identically like the valves described on the two preceding pages. Being our Heavy Pattern, they are fully warranted for working pressure up to 150 pounds per square inch.

We are prepared to furnish these valves with English instead of American Standard Pipe Threads.

PRICE LIST.

Size, .....Inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Heavy Iron Body Brass Mounted Horizontal Check Valves, Screw Ends, ...each	3 60	6 50	8 90	12 25	14 25	19 00	22 00	30 00	45 00	57 00	105 00	155 00
Heavy Iron Body Brass Mounted Angle Check Valves, Screw Ends, ...each	3 60	6 50	8 90	12 25	14 25	19 00	22 00	30 00	45 00	57 00	105 00	155 00

For general dimensions see list on page 407.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
IRON BODY CHECK VALVES.

Heavy Pattern.

For 150 Pounds Working Pressure.

Brass Mounted—Extra Quality.

Horizontal and Angle Patterns. Flange Ends.



Fig. 569.
Horizontal Check Valve.
Flange Ends.



Fig. 632.
Angle Check Valve.
Flange Ends.

These valves are similar to those on preceding page, but are provided with flange ends. They are guaranteed for 150 pounds working pressure. Valves with tongued and grooved, or male and female body flanges, with companion flanges to match, can be had if desired. See page 255 for price list of companion flanges.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Heavy Iron Body Brass Mounted Horizontal Check Valves, Flange Ends.....each	7 50	11 00	17 00	19 00	21 50	26 50	31 00	41 00	57 00	69 00	130 00	190 00
Heavy Iron Body Brass Mounted Angle Check Valves, Flange Ends.....each	7 50	11 00	17 00	19 00	21 50	26 50	31 00	41 00	57 00	69 00	130 00	190 00

For dimensions of these valves see page 407.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER IRON BODY CHECK VALVES.

Extra Heavy Pattern.

For 250 Pounds Working Pressure.

Brass Mounted. Extra Quality.

Horizontal and Angle Patterns. Screw Ends.



Fig. 900.
Horizontal Check Valve,
Screw Ends.



Fig. 901.
Angle Check Valve,
Screw Ends.

The above are guaranteed to stand a working pressure of 250 pounds per square inch. They are strong, practical and durable, and will readily withstand long and severe usage. If desired, these valves can be made of Semi-Steel, the tensile strength of which is over 30,000 pounds. Prices will be furnished on application.

PRICE LIST.

Size,..... Inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Extra Heavy Iron Body Brass Mounted, Horizontal Check Valve, Screw Ends.....each	23 00	26 50	29 50	34 00	37 00	43 00	49 00	60 00	76 00	91 00	150 00	200 00
Extra Heavy, Iron Body Brass Mounted, Angle Check Valve, Screw Ends,.....each	23 00	26 50	29 50	34 00	47 00	43 00	49 00	60 00	76 00	91 00	150 00	200 00

For general dimensions see page 408.

All genuine valves have the name LUNKENHEIMER cast on the body.

**LUNKENHEIMER
IRON BODY CHECK VALVES.**

Extra Heavy Pattern.

For 250 Pounds Working Pressure.

Brass Mounted—Extra Quality.

Horizontal and Angle Patterns. Flange Ends.



**Fig. 902.
Horizontal Check Valve.
Flange Ends.**



**Fig. 903.
Angle Check Valve.
Flange Ends.**

These valves are guaranteed to stand a working pressure of 250 pounds per square inch, the principles of construction being identical with those shown on the several preceding pages. The body and cap are made of the very best grade of hard, close-grained iron, and the latter is firmly held to the body by large steel bolts, the heads and nuts of which seat on finished surfaces. The seat and disc are made of a bronze composition of the highest grade, the disc is well guided at top and bottom, and the valve can readily be reground without necessitating its removal from the pipe. The above made of semi-steel can be had at a special discount from price list below. Tongued and grooved, or male and female body flanges, with companion flanges to match, can be had if desired. For prices of companion flanges see page 255.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Extra Heavy Iron Body Brass Mounted, Horizontal Check Valves, Flange Ends, .....each	25 00	28 00	32 00	36 00	40 00	46 00	52 00	64 00	80 00	96 00	160 00	240 00
Extra Heavy Iron Body Brass Mounted, Angle Check Valves, Flange Ends, .....each	25 00	28 00	32 00	36 00	40 00	46 00	52 00	64 00	80 00	96 00	160 00	240 00

All genuine valves have the name LUNKENHEIMER cast on the body.

For general dimensions see page 408.

LUNKENHEIMER
REGRINDING SWING CHECK VALVES

Medium Pattern.

Screw or Flange Ends.

Iron Body Brass Mounted.

For 125 Pounds Working Pressure.



Fig. 228.
Screw Ends.



Fig. 933.
Flange Ends.

The description on page 60 also applies to the above, as the principles of construction of these valves are the same. The bodies of the above, together with the caps, however, are made of a hard close-grained iron, but the wearing parts of the valves are of a high-grade bronze, such as will stand long and severe usage. The bronze seat is tightly screwed into body, and should the valve leak, the same can be easily reground, see page 60 for directions how to regrind. The cap is firmly secured to the body by large steel studs, with nuts seating on spot-faced surfaces.

PRICE LIST.

Size.....Inches	2	2½	3	3½	4	4½	5	6	7	8
Iron Body Brass Mounted, Screw Ends, .....each	6 25	10 00	12 00	16 00	18 00	21 00	25 00	32 00	41 00	50 00
Iron Body Brass Mounted, Flange Ends, .....each	8 00	12 00	14 50	19 00	21 00	24 50	29 00	37 00	46 00	55 00

For general dimensions see list on page 409.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
REGRINDING SWING CHECK VALVES.

Heavy Pattern.

Screw or Flange Ends.

Iron Body Brass Mounted.

For 150 Pounds Working Pressure.



Fig. 597.
Screw Ends.



Fig. 598.
Flange Ends.

The design of the above is identically the same as those on preceding page, but, being our Heavy Pattern, they are guaranteed for working pressures up to 150 pounds per square inch.

See page 60 for directions for regrinding.

When so ordered we will furnish these valves with tongued and grooved, or male and female body flanges, and companion flanges to match. See page 255 for price of companion flanges.

PRICE LIST.

Size.....inches	2	2½	3	3½	4	4½	5	6	7	8
Heavy Pattern, Iron Body Brass Mounted Swing Check Valves, Screw Ends, Fig. 597.....each	6 25	10 00	12 00	16 00	18 00	21 00	25 00	32 00	41 00	50 00
Heavy Pattern, Iron Body Brass Mounted Swing Check Valves, Flange Ends, Fig. 598.....each	11 00	15 50	18 00	23 00	25 50	29 50	35 00	44 00	54 00	64 00

For general dimensions see list on page 410.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
REGRINDING SWING CHECK VALVES.

Extra Heavy Pattern.

Screw or Flange Ends.

Iron Body Brass Mounted.

For 250 Pounds Working Pressure.



Fig. 324.
Screw Ends.



Fig. 323.
Flange Ends.

Lunkenheim Iron Body Brass Mounted Extra Heavy Regrinding Swing Check Valves are guaranteed to give entire satisfaction for pressures not exceeding 250 pounds per square inch. As all wearing parts are renewable, the valve is very durable. Unlike those on the two preceding pages, the caps are secured to the bodies by large steel bolts and nuts, both the heads and nuts seating on finished surfaces.

Tongued and grooved or male and female body flanges with companion flanges to match will be furnished when so ordered. See page 255 for list price of flanges.

The above made of semi-steel the tensile strength of which is over 30,000 lbs., can be had if desired. Prices on application.

See page 60 for complete description.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6
Extra Heavy Pattern Iron Body Brass Mounted Swing Check Valves, Screw Ends,.....each	26 00	30 00	33 00	39 00	42 00	48 00	55 00	68 00
Extra Heavy Pattern Iron Body Brass Mounted Swing Check Valves, Flange Ends,.....each	28 00	32 00	36 00	41 00	45 00	52 00	60 00	72 00

All genuine valves have the name LUNKENHEIMER cast on the valve shell.

**LUNKENHEIMER
DOUBLE SEATED "CLIP" GATE VALVES.**

PATENTED.

Iron Body Brass Mounted and All Iron.

**For 100 Pounds Working
Pressure. Screw
or Flange Ends.**



**Fig. 600. Screw Ends.
1/2 to 2 inches inclusive.**



**Fig. 638. Flange Ends.
1 to 2 inches inclusive.**



Sectional.



**Fig. 600.
2 1/2 to 6 inches inclusive.**



**Fig. 638.
2 1/2 to 6 inches inclusive.**

This valve is unequalled for use where pressure does not exceed 100 pounds. It is simple in construction, compact in design, strong, well made and consequently very durable.

The construction is free from complicated mechanism, and the operating parts consist of the bronze wedge-shaped disc, which has two faces, and is seated in the valve shell between seat rings of the same material.

"Clip" Gate Valves—Continued.

The valve will take pressure from either end, and can be connected in any position. The hub or bonnet of the valve is secured to the body by means of a round steel clip which surrounds the body and passes through lugs on sides of hub and is fastened by means of two nuts. This simple arrangement has an advantage over other means of connecting the parts of a valve, inasmuch as it permits of easy access to the interior at all times.

The joint between the hub and the body is indestructible, and consists of a seamless copper wire washer, partially imbedded in the top surface of the valve body, the portion which protrudes above said surface forming the joint against the under face of the hub when the two parts are connected together. This valve can be opened or closed quicker than any other, an advantage which users will appreciate.

All the bearing parts of the valve (i. e., stem, disc, seats and stuffing-box) are made of bronze and the hub and body of iron; the several parts are well proportioned and heavy, and as the body is rigid there is no liability of springing the seats when connecting to pipes, as is sometimes the case with light brass valves. The construction of the valve also permits of repacking the stuffing-box while the valve is either open or closed.

The "Clip" Gate Valves are also made entirely of iron, no brass whatever being used in their construction. These all iron valves are especially adapted for handling cyanides, acids and other liquids which attack brass. Thousands are in use in cyanide plants, and for that purpose they are admittedly the best valves ever designed.

Each valve is carefully tested and fully warranted in every respect, and it is beyond doubt the best low-priced gate valve on the market.

PRICE LIST.

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
Iron Body Brass Mounted, Screw Ends, Fig. 600, ..ea.	1 50	1 90	2 50	3 50	5 00	7 50	12 00	15 00	18 00	20 00	23 00	25 00	30 00
Iron Body Brass Mounted, Flange Ends, Fig. 638, ..ea.	.....	.....	3 00	4 90	6 00	8 50	13 50	16 90	20 30	22 50	26 00	28 30	33 80
All Iron, Screw Ends, Fig. 319, .....each	1 50	1 90	2 50	3 50	5 00	7 50	12 00	15 00	18 00	20 00	23 00	25 00	30 00
All Iron, Flange Ends, Fig. 318, .....each	.....	.....	3 00	4 90	6 00	8 50	13 50	16 90	20 30	22 50	26 00	28 30	33 80

For dimensions see list on page 411.

Unless otherwise specified we will fill all orders with Iron Body Brass Mounted, Screw End Valves.

All genuine valves have LUNKENHEIMER cast on hub.

"Clip" Valves can be furnished with English Standard Threads or Flanges instead of American, when so ordered.

LUNKENHEIMER
DOUBLE SEATED "CLIP" GATE VALVES.
PATENTED.

Iron Body Brass Mounted and All Iron.

For 50 Pounds Working Pressure. Quick Opening Pattern.
Screw or Flange Ends.



Fig. 639. Screw Ends.



Fig. 640. Flange Ends.

These valves are similar in construction in most respects to our regular pattern "Clip" Valves (see pages 91 and 92 for general description), the difference being that they are intended to be operated by a lever attachment instead of the ordinary hand wheel. These have been designed to supply the demand for low-priced, reliable quick opening valves of this style, and we guarantee them to give satisfaction when used in places where pressure does not exceed 50 pounds. The lever is provided with a lock nut device, by which means the disc can be held at any desired degree of opening.

For handling cyanides, acids, etc., these valves are made entirely of iron, but unless otherwise specified all orders will be filled with Iron Body Brass Mounted, Screw End Valves.

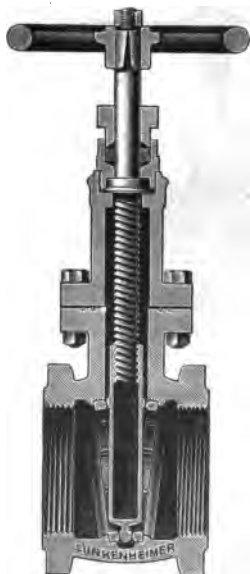
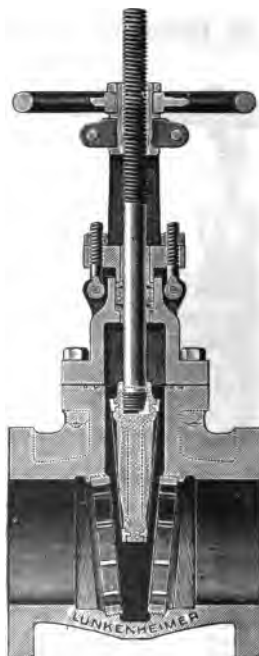
PRICE LIST.

Size.....inches	$\frac{1}{8}$	$\frac{3}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
Iron Body, Brass Mounted, Screw Ends, Fig. 639	1 50	1 90	2 50	3 50	5 00	7 50	12 00	15 00	18 00	20 00	23 00	25 00	30 00
.....each													
Iron Body, Brass Mounted, Flange Ends, Fig. 640	1 50	1 90	2 50	3 50	5 00	7 50	12 00	15 00	18 00	20 00	23 00	25 00	30 00
.....each													
All Iron, Screw Ends, Fig. 321	1 50	1 90	2 50	3 50	5 00	7 50	12 00	15 00	18 00	20 00	23 00	25 00	30 00
.....each													
All Iron, Flange Ends, Fig. 320	1 50	1 90	2 50	3 50	5 00	7 50	12 00	15 00	18 00	20 00	23 00	25 00	30 00
.....each													

For general dimensions see list on page 411.

"Clip" Valves can be furnished with English Standard Threads and Flanges instead of American, when so ordered.

All genuine valves have LUNKENHEIMER cast on hub.

LUNKENHEIMER
"VICTOR" GATE VALVES.**Iron Body Brass Mounted.****Section of Medium Pattern Valve
with Stationary Stem.****Section of Extra Heavy Pattern
Valve with Outside Screw
and Yoke.**

The extensive use of Lunkenheimer "Victor" Gate Valves has demonstrated that their durability and efficiency are fully appreciated by steam users all over the world, they being specified by the leading engineers for use in high-pressure power plants. They are made in three different weights, which we term our Medium, Heavy and Extra Heavy Patterns, and are guaranteed for working pressures up to 125, 150 and 250 pounds per square inch respectively.

The valves are made in two different forms, one with stationary stem, as shown in the illustration to the left, and the other with rising stem and outside screw and yoke, as shown to the right. The latter of these two forms is better adapted for high steam pressures, inasmuch as the threads on the stem are not exposed to the corroding action of the steam, and, being accessible for oiling, the life of same is therefore prolonged.

The seat rings, as well as the wedge disc, can be renewed when worn, thus making the valves as good as new. Particular attention is called to the fact that

Lunkenheimer "Victor" Gate Valves—Continued.

in finishing the interior of the valve body that portion which receives the seat rings is threaded to the correct angle of the tapers of the valve disc. The seat rings are threaded and faced off straight, and when screwed in place they fit accurately to the tapers of the disc. This method is superior to that used by some manufacturers, who finish the tapers of the disc on the seats after the latter are screwed in place, because if the seats in the valves constructed in this manner should become slightly unscrewed they would not fit to the disc tapers, and in no event could they be renewed.

The discs in both forms of valves are made entirely of bronze up to and including the 6-inch size, above which they are made of iron with bronze seat rings. These rings, as shown in the illustration to the right on opposite page, are forced on the disc, a flange on the rings being flared out in a groove cut at an angle in the iron disc. This method of securing the bronze rings to the disc is far superior to screwing them on, as there is absolutely no danger of the rings becoming loose or dropping off. As the valves are double-seated, they will take pressure from either end.

Either pattern of the "Victor" Gate Valves can be packed under pressure when wide open. The stuffing box in the valve with stationary stem (shown in the view to the left on opposite page) is made of bronze, and is tightly screwed into the hub. In our extra heavy valves with Outside Screw and Yoke, both the gland and stuffing box are lined with bronze bushings, which forms a perfect bearing surface for the stems.

The discs are accurately guided in the bodies, and by means of the guides the stems are relieved of all side strains, which have a tendency to wear out the threads on same. The stems in both forms of valves are made of rolled Tobin bronze, a material having a tensile strength nearly equal to that of steel.

The general design of the "Victor" Valves is unsurpassed, and all parts are heavy, yet compact. This point will be appreciated when comparison is made with some forms of valves which are unnecessarily bulky and cumbersome for the pressures for which the "Victor" Valves are recommended. Where "Victor" Valves are installed the strains on the connecting pipes (due to the weight of the valves) are minimized, and, owing to their compactness, they are not affected to any extent by expansion or contraction.

The joint between the body and the hub is worthy of attention, for the reason that it is practically indestructible. It consists of grooves cut in the top surface of the valve body, in which are placed seamless copper gaskets. A joint made in this manner will never leak, and cannot wear out. The yokes and hubs are rigidly held to the body by large steel bolts, both the heads and nuts of which seat on spot-faced surfaces, insuring even and true bearing surfaces.

All wearing parts are made of the very best bronze composition and the body and hub of hard, close-grained iron. The workmanship is unsurpassed, and all valves are carefully tested before shipment from our factory and guaranteed first class in every particular.

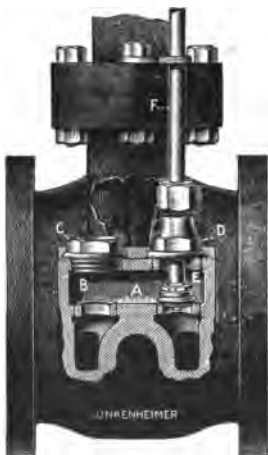
When so ordered, "Victor" Valves are furnished with English instead of American Standard pipe threads and flanges, or they can be had with tongued and grooved body flanges, with companion flanges to match, if desired. Our Extra Heavy Pattern Valves can be made of semi-steel, a material having a tensile strength of over 30,000 pounds. Prices on application.

All genuine valves have the name LUNKENHEIMER cast on the bodies.

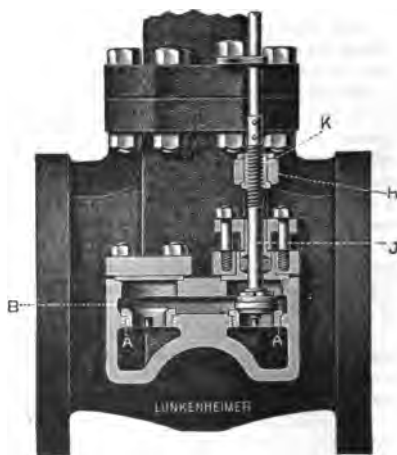
LUNKENHEIMER
"VICTOR" GATE VALVES WITH BY-PASS.

PATENTED.

Iron Body Brass Mounted.



**Section of Medium Pattern "Victor"
Gate Valve with By-Pass.**



**Section of Extra Heavy Pattern "Victor"
Gate Valve with By-Pass.**

Where it is desired to install Gate Valves with By-Pass, we are prepared to supply our "Victor" Valves with the unique and simple design shown in the cuts herewith, and we claim that, for many reasons, this form of By-Pass is superior to any other.

The By-Pass used on our "Victor" Valves is not separate from the valve proper, but is cast integral with the body, as will be seen by the illustrations above, and this method has many points of excellence. The additional metal required for the by-pass tends to strengthen the valve body; being self-contained, it is not affected by extremes of expansion and contraction, which tend to distort the valves used on separate exterior by-passes.

The Lunkensheimer Patented By-Pass is made in two forms, the sectional view to the left above illustrating the form used on our Medium and Heavy patterns, while the one to the right illustrates that used on our Extra Heavy "Victor" Valves.

"Victor" Gate Valves with Patent By-Pass—Continued.

Each pattern, however, consists of a cored passage B leading around the port of the valve, and have two valve seats A, A. Opposite one seat is mounted a valve trimming, and a plug or flange is screwed or bolted opposite the other. Only one seat is intended to be in use, but the object of having two seats is to make it possible, should one become worn and leak, to reverse the position of the valve trimming and cap or flange, thereby making use of the reserve valve seat.

The construction of the By-Pass used on our Medium Pattern Valves can readily be understood by reference to the illustration to the left on opposite page. The difference between the By-Passes on our Medium and Extra Heavy Pattern Valves consists in the trimmings only, and we call particular attention to that of our Extra Heavy Pattern, as illustrated to the right on the opposite page. These valves being intended for very high pressures, the construction of the By-Pass trimmings must necessarily be in keeping. It will be seen that, instead of being screwed into the body, they are bolted thereto (as is also the flange above the reserve valve seat) by a number of large steel studs and nuts, the latter seating on spot-faced surfaces. The stuffing box is made of bronze and has a flange on the bottom thereof, which prevents the iron flange above it from touching the iron body, and hence prevents corrosion between these surfaces.

It will be seen that the trimming is constructed with outside screw and yoke H, which increases the durability of the threads on the stem J, owing to the fact that they do not come in contact with the steam. The bushing K, which is threaded to receive the threads on the stem J, not only prevents corrosion, but also makes it possible to renew the same should the threads in the bushing become worn.

The discs in both forms of By-Pass Valves are constructed on the same principles as those in our Regrinding Globe Valves, and consequently they can be reground when worn.

The areas of our By-Passes are sufficient to admit enough steam around the disc to quickly equalize the pressure on both sides. They are accessible at all times, and the use of a by-pass on large valves, or on those of any size subjected to high pressures, results not only in making the valves easier to operate, but in largely increasing their durability. We recommend that all valves, including the 5-inch size and above, be ordered with by-pass.

Our form of by-pass takes up but little space, and where it is desired to cover the valve body with magnesia, or other non-conducting material, it can easily be accomplished.

For a complete description of our "Victor" Valves without by-pass see pages 94 and 95

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
DOUBLE SEATED "VICTOR" GATE VALVES.

Medium Pattern.

Iron Body Brass Mounted and All Iron.

Screw or Flange Ends. Stationary Stem.

For 125 Pounds Working Pressure.



Fig. 243. Screw Ends.



Fig. 941. Flange Ends.

These valves are provided with Stationary Stems, and are suitable for working pressures up to 125 pounds. "Victor" Valves intended for use in handling cyanides, acids and other liquids which attack brass, are made entirely of iron. See price list below. When ordering always give Figure Number. Unless otherwise specified, we will fill all orders with Iron Body Brass Mounted Valves.

A general description of the above is given on pages 94 and 95.

PRICE LIST.

Size, ..inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mtd., Screw Ends, Fig. 243, each	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	00.....	00.....	00.....
Iron Body Brass Mtd., Flange Ends, Fig. 941, each	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	235 00	300 00	370 00
All Iron, Screw Ends, Fig. 333, each	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	00.....	00.....	00.....
All Iron, Flange Ends, Fig. 332, each	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	00.....	00.....	00.....

For general dimensions see page 413.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard threads or flanges.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES WITH
INDICATOR.

Medium Pattern.

Iron Body Brass Mounted.

Screw or Flange Ends. Stationary Stem.

For 125 Pounds Working Pressure.



Fig. 605.
Screw Ends.



Fig. 608.
Flange Ends.

To make it possible to ascertain the degree of opening of our "Victor" Gate Valves with Stationary Stem, we can furnish same with indicator, as shown in illustration above.

These valves are guaranteed for 125 pounds working pressure. Pages 94 and 95 fully describe and illustrate the valves shown above.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mtd., Screw Ends, ea.	10 00	12 00	15 50	24 00	32 00	37 50	46 50	58 50	66 00	82 50	98 50	125 00	180 00	.....	.....	.....
Iron Body Brass Mtd., Flange Ends, ea.	10 00	12 00	15 50	24 00	32 00	37 50	46 50	58 50	66 00	82 50	98 50	125 00	180 00	245 00	315 00	390 00

For general dimensions see page 413.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard threads or flanges.

All genuine valves have the name LUNKENHEIMER cast on shell.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES.**Quick Opening, Medium Pattern.****Iron Body Brass Mounted or all Iron.****Screw or Flange Ends.****For 125 Pounds Working Pressure.****Fig. 609.**
Screw Ends.**Fig. 610.**
Flange Ends.

The Quick Opening Pattern of "VICTOR" valves is provided with a lever attachment instead of hand-wheel, and will be found excellent for the various purposes for which valves of this kind are required. The lever has a wing-nut device to lock the disc at any desired degree of opening. When ordering, always give Figure Number.

These valves are also made entirely of iron for use in handling cyanides and other acids, but when not otherwise specified, we will fill all orders with Iron Body Brass Mounted Valves, with screw ends, suitable for 125 pounds working pressure.

For a general description of the above valves, see pages 94 and 95

PRICE LIST.

Size, inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mtd., Screw Ends, Fig. 609, ea.	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	.....	.....	.....
Iron Body Brass Mtd., Flange Ends, Fig. 610, ea.	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	235 00	300 00	370 00
All Iron, Screw Ends, Fig. 331, each	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	.....	.....	.....
All Iron, Flange Ends, Fig. 330, each	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	235 00	300 00	370 00

For general dimensions see page 415.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard threads or flanges.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES, WITH
OUTSIDE SCREW AND YOKE.

Medium Pattern.

Iron Body Brass Mounted or all Iron.

Screw or Flange Ends.

For 125 Pounds Working Pressure.



Fig. 242.
Screw Ends.



Fig. 943.
Flange Ends.

These valves are guaranteed for 125 pounds working pressure. See pages 94 and 95 for a full description.

The above can be had made entirely of iron for use in handling cyanides and other acids. Unless otherwise specified, however, they will be furnished iron body brass mounted with screw ends.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mtd., Fig. 242, or all Iron, Fig. 329, Screw Ends, .....each	12 00	15 00	19 00	30 00	38 00	45 00	53 00	66 00	75 00	94 00	112 00	142 00	210 00	.....	.....	.....
Iron Body Brass Mtd., Fig. 943, or all Iron, Fig. 328, Flange Ends, .....each	12 00	15 00	19 00	30 00	38 00	45 00	53 00	66 00	75 00	94 00	112 00	142 00	210 00	290 00	380 00	430 00

For general dimensions see page 417.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard threads or flanges.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES, WITH
PATENT BY-PASS.

Medium Pattern.

Iron Body Brass Mounted. Screw or Flange Ends.

Stationary Stem.

For 125 Pounds Working Pressure.



Fig. 229.
Screw Ends.



Fig. 942.
Flange Ends.

These valves are similar in construction to our regular Stationary Stem "Victor" Valves, but are provided with our improved form of By-Pass. The advantages and importance of by-passing valves are fully described, and a sectional view of this valve showing its interior construction is illustrated on pages 96 and 97. For a complete description of "Victor" Valves without by-pass, see pages 94 and 95.

The above are guaranteed for 125 pounds working pressure.

PRICE LIST.

Size,.....inches	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mounted, Screw Ends,.....each	46 50	58 50	66 00	82 50	98 50	126 50	187 00			
Iron Body Brass Mounted, Flange Ends,.....each	46 50	58 50	66 00	82 50	98 50	126 50	187 00	260 00	330 00	410 00

For general dimensions see page 413.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard threads or flanges.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES WITH
PATENT BY-PASS.

Medium Pattern.

Iron Body Brass Mounted. Screw or Flange Ends.

Outside Screw and Yoke.

For 125 Pounds Working Pressure.



Fig. 232.
Screw Ends.

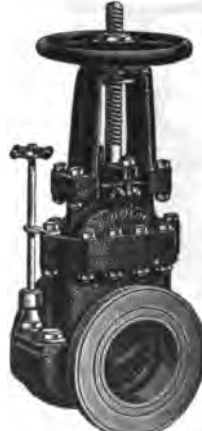


Fig. 944.
Flange Ends.

Heavy, compact and durable, the "Victor" Gate Valves with Outside Screw and Yoke and Patent By-Pass are the ideal steam valves. They are extensively used and are giving universal satisfaction. The above being our Medium Pattern, are guaranteed for working pressures up to 125 pounds per square inch. A complete description of the valve proper is given on page 94 and 95, and of the By-Pass on pages 96 and 97.

PRICE LIST.

Size.....Inches	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mounted, Screw Ends,.....each	58 00	72 00	81 00	100 00	120 00	154 00	227 00	.....	.....	.....
Iron Body Brass Mounted, Flange Ends,.....each	58 00	72 00	81 00	100 00	120 00	154 00	227 00	310 00	405 00	450 00

For general dimensions see page 417.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard threads or flanges.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES.

Stationary Stem.

Heavy Pattern.

Iron Body Brass Mounted.

Screw or Flange Ends.

For 150 Pounds Working Pressure.



Fig. 602.
Screw Ends.



Fig. 603.
Flange Ends.

The above are guaranteed to stand a working pressure of 150 pounds per square inch. A full and complete description is given on pages 94 and 95.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mtd., Screw Ends, ea.	9 00	11 00	14 00	22 00	29 00	34 00	42 00	53 00	60 00	75 00	90 00	115 00	170 00	.....	.....	.....
Iron Body Brass Mtd., Flange Ends, ea.	11 70	14 00	17 50	26 00	33 00	39 00	47 50	60 00	68 00	83 00	99 00	125 00	185 00	265 00	340 00	420 00

For general dimensions see page 413.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard Pipe Threads.

All genuine valves have the name LUNKENHEIMER cast on the shell.

"Victor" Valves can be furnished with tongued and grooved, or male and female body flanges with companion flanges to match when required. For dimensions see page 423, and for list price of flanges see page 255.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES WITH
OUTSIDE SCREW AND YOKE.

Heavy Pattern.

Iron Body Brass Mounted.

Screw or Flange Ends.

For 150 Pounds Working Pressure.



Fig. 642.
Screw Ends.

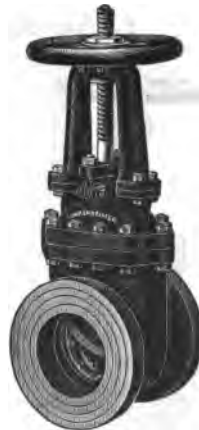


Fig. 643.
Flange Ends.

For a complete description of the above see pages 94 and 95. Be sure to give the Figure Number when ordering. These valves are guaranteed for working pressures up to 150 pounds per square inch.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mtd., Screw Ends, ea.	12 00	15 00	19 00	23 00	30 00	38 00	45 00	53 00	66 00	75 00	94 00	112 00	142 00	210 00	.....	.....
Iron Body Brass Mtd., Flange Ends, ea.	15 00	18 00	22 50	34 00	42 00	50 00	59 00	73 00	83 00	105 00	125 00	155 00	225 00	310 00	405 00	460 00

For general dimensions see page 417.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard Pipe Threads.

All genuine valves have the name LUNKENHEIMER cast on the body.

"Victor" Valves can be furnished with tongued and grooved or male and female body flanges with companion flanges to match when required. For dimensions see page 423 and for list price of flanges see page 255.

LUNKENHEIMER
DOUBLE SEATED "VICTOR" GATE VALVES WITH
PATENT BY-PASS.

Heavy Pattern.

Iron Body Brass Mounted.

Stationary Stem. Screw or Flange Ends.

For 150 Pounds Working Pressure.



Fig. 636.
Screw Ends.



Fig. 637.
Flange Ends.

For a complete description of the valve proper, see pages 94 and 95, and of the By-Pass, pages 96 and 97. The above are guaranteed to stand a working pressure of 150 pounds per square inch.

PRICE LIST.

Size.....inches	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mounted, Screw Ends, .....each	46 50	58 50	66 00	82 50	98 50	126 50	187 00	.....	.....	.....
Iron Body Brass Mounted, Flange Ends, each	52 00	65 00	74 00	91 00	110 00	135 00	200 00	280 00	355 00	440 00

For general dimensions see page 413.

"Victor" Valves, when so ordered, can be had with English instead of American Standard pipe threads.

All genuine valves have the name LUNKENHEIMER cast on the body.

"Victor" Valves can be furnished with tongued and grooved or male and female body flanges with companion flanges to match when required. For dimensions see page 423, and for list price of flanges see page 255.

LUNKENHEIMER
DOUBLE SEATED "VICTOR" GATE VALVES WITH
PATENT BY-PASS.

Heavy Pattern.

Iron Body Brass Mounted.

Outside Screw and Yoke. Screw or Flange Ends.

For 150 Pounds Working Pressure.



Fig. 644.
Screw Ends.



Fig. 645.
Flange Ends.

For a complete description of the valve proper, see pages 94 and 95, and of the By-Pass, pages 96 and 97. The above are guaranteed to stand a working pressure of 150 pounds per square inch.

PRICE LIST,

Size.....inches	5	6	7	8	9	10	12	14	15	16
Iron Body Brass Mounted, Screw Ends,.....each	58 00	72 00	81 00	100 00	120 00	154 00	227 00	.....	.....	.....
Iron Body Brass Mounted, Flange Ends,.....each	64 00	79 00	89 00	110 00	130 00	165 00	240 00	330 00	430 00	480 00

For general dimensions see page 417.

"Victor" Valves, when so ordered, can be had with English instead of American Standard Pipe Threads.

All genuine valves have the name LUNKENHEIMER cast on the body.

"Victor" Valves can be furnished with tongued and grooved or male and female body flanges with companion flanges to match when required. For dimensions see page 423 and for list price of flanges see page 255.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES.
STATIONARY STEM.
Extra Heavy Pattern.
Iron Body Brass Mounted.
Screw or Flange Ends.
For 250 Pounds Working Pressure.



Fig. 887.
Screw Ends.



Fig. 888.
Flange Ends.

The above are heavy and compact in design and are guaranteed for working pressures up to 250 pounds per square inch. They are being specified by the leading engineers in the country for high pressure use, and are giving entire satisfaction.

Our Extra Heavy Iron Body Valves can be made of Semi-Steel if desired. prices on application.

Pages 94 and 95 give a complete description of the above.

PRICE LIST.

Size, ...inches	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	14	15	16
Iron Body Brass Mtd. Screw Ends, ea.	25 00	28 00	36 00	41 00	46 00	51 00	61 00	66 00	81 00	100 00	120 00	205 00	305 00	.....	.....	.....
Iron Body Brass Mtd. Flange Ends, ea.	25 00	28 00	36 00	41 00	46 00	51 00	61 00	66 00	81 00	100 00	120 00	205 00	305 00	405 00	405 00	560 00

For general dimensions see page 419.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard Pipe Threads.

All genuine valves have the name LUNKENHEIMER cast on the shell.

"Victor" Valves can be furnished with tongued and grooved or male and female body flanges with companion flanges to match when required. For dimensions see page 423, and for list price of flanges see page 255.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES, WITH
OUTSIDE SCREW AND YOKE.

Extra Heavy Pattern.

Iron Body Brass Mounted.

Screw or Flange Ends.

For 250 Pounds Working Pressure.



Fig. 891.
Screw Ends.



Fig. 892.
Flange Ends.

See pages 94 and 95 for complete description. The above are fully guaranteed for working pressures up to 250 pounds and are strong, compact, practical and durable.

If desired, they can be made of Semi-Steel, the tensile strength of which is over 30,000 pounds.

Prices on application.

PRICE LIST.

Size, ....inches	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	14	15	16
Iron Body Brass Mtd., Screw Ends, ea.	31 00	36 00	46 00	51 00	61 00	66 00	76 00	86 00	110 00	130 00	150 00	255 00	.....	.....	.....	.....
Iron Body Brass Mtd., Flange Ends, ea.	31 00	36 00	46 00	51 00	61 00	66 00	76 00	86 00	110 00	130 00	150 00	255 00	355 00	455 00	455 00	610 00

For general dimensions see page 421.

"Victor" Valves, when so ordered, can be had with English instead of American Standard pipe threads.

All genuine Valves have the name LUNKENHEIMER cast on the shell.

"Victor" Valves can be furnished with tongued and grooved or male and female body flanges with companion flanges to match when required. For dimensions see page 423 and for list price of flanges see page 255.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES WITH
PATENT BY-PASS.

Extra Heavy Pattern.

Iron Body Brass Mounted. Screw or Flange Ends.

Stationary Stem.

For 250 Pounds Working Pressure.



Fig. 889.
Screw Ends.



Fig. 890.
Flange Ends.

These valves are guaranteed to stand a working pressure of 250 pounds per square inch. For a complete description of the valve proper, see pages 94 and 95. and of the By-Pass, see pages 96 and 97. Be sure to give Figure Number when ordering. The above made of Semi-Steel, the tensile strength of which is over 30,000 pounds can be had if desired. Prices on application.

PRICE LIST.

Size, .....inches	5	6	7	8	10	12	14	15	16
Iron Body Brass Mounted, Screw Ends, .....each	80 00	100 00	120 00	150 00	255 00	355 00	.....	.....	.....
Iron Body Brass Mounted, Flange Ends, .....each	80 00	100 00	120 00	150 00	255 00	355 00	455 00	455 00	610 00

For general dimensions see page 419.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard pipe threads.

All genuine valves have the name LUNKENHEIMER cast on the body.

"Victor" Valves can be furnished with tongued and grooved or male and female body flanges, with companion flanges to match, when required. For dimensions see page 423 and for list price of companion flanges see page 255.

**LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES, WITH
PATENT BY-PASS.**

Extra Heavy Pattern.

Iron Body Brass Mounted. Screw or Flange Ends.

Outside Screw and Yoke.

For 250 Pounds Working Pressure.



**Fig. 893.
Screw Ends.**



**Fig. 894.
Flange Ends.**

The above are heavy throughout, being ideal valves for high-pressure power plants, and are guaranteed for working pressures up to 250 pounds. When ordering always give the Figure Number. These valves made of Semi-Steel, the tensile strength of which is over 30,000 pounds, can be had if desired. Prices on application.

For a description of the valve without by-pass, see pages 94 and 95, and for a description of the by-pass, see pages 96 and 97.

PRICE LIST.

Size, .....inches	5	6	7	8	10	12	14	15	16
Iron Body Brass Mounted, Screw Ends, .....each	100 00	130 00	155 00	190 00	305 00	405 00			
Iron Body Brass Mounted, Flange Ends, .....each	100 00	130 00	155 00	190 00	305 00	405 00	505 00	505 00	660 00

For general dimensions see page 421.

"Victor" Valves, when so ordered, can be furnished with English instead of American Standard pipe threads.

All genuine valves have the name LUNKENHEIMER cast on the body.

"Victor" Valves can be had with tongued and grooved or male and female body flanges, with companion flanges to match, if desired. For dimensions see page 423, and for list price of companion flanges see page 255.

LUNKENHEIMER

**DOUBLE SEATED "VICTOR" GATE VALVES
WITH GEAR LIFT.**

Iron Body Brass Mounted.

Screw or Flange Ends.



Fig. 391.
Flange Ends.

While the above illustrates our Iron Body Brass Mounted "Victor" Gate Valve with Outside Screw and Yoke, we are also prepared to furnish same with Stationary Stem. Spur instead of bevel gearing can be had where it is desired to have the operating gear spindle stand in a vertical position.

We can furnish these valves with either screw or flange ends, in medium, heavy or extra heavy patterns, suitable for 125, 150 and 250 pounds per square inch working pressure, respectively, and with tongued and grooved or male and female body and companion flanges, when so ordered.

Dimensions and prices will be furnished upon application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
DOUBLE SEATED "VICTOR" GATE VALVES, WITH
HYDRAULIC OR PNEUMATIC LIFT.

Iron Body Brass Mounted.

Screw or Flange Ends.



Fig. 392.
Flange Ends.

To facilitate the operation of our large "Victor" Valves, we are prepared to furnish same with Hydraulic or Pneumatic Lift, as shown in the illustration above. These valves are made only to order and it is therefore necessary that we know what pressure per square inch can be carried to the cylinder in order that we may more readily calculate the size of same. Also state whether water, oil or air is to be used in the cylinder for operating the valve.

The cylinder can be fitted with a four-way cock and the necessary piping for controlling the movement of the piston. The stuffing boxes are packed and the valve is ready for immediate use when sent out of the factory.

The above can be had furnished with screw or flange ends, in medium, heavy or extra heavy patterns, suitable for 125, 150 and 250 pounds per square inch, respectively, and tongued and grooved or male and female body and companion flanges can be had when so ordered.

Dimensions and prices will be furnished on application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES.

Medium Pattern.

Stationary Stem. Screw or Flange Ends.

BRASS.

For 150 Pounds Working Pressure.



Fig. 762.
Screw Ends.

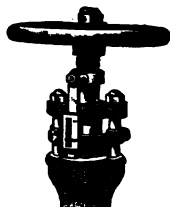


Fig. 309.
Detail View Showing Indicator Attachment.



Fig. 763.
Flange Ends.

The design of the above valves is identical with that of our Iron Body Valves with Stationary Stem, a sectional view of which is shown on page 94 to the left. See pages 94 and 95 for a general description.

These valves can be furnished with indicator, as shown in detailed view above, or the Quick-Opening Pattern can also be had, the Iron Body Pattern of which is shown on page 100. With the exception of the hand wheel, studs and bolts, the former of which is made of iron and latter of steel with bronze nuts seating on spot-faced surfaces, the material is of the very highest grade of bronze composition.

These valves have but a single disc, which is double-seated, and consequently pressure can be taken from either end. Should the seats wear, they can easily be renewed, and as all parts of the valve are interchangeable, any worn out or broken piece can be replaced. The above being our Medium Pattern, are guaranteed to stand a working pressure of 150 pounds.

For Navy requirements, we can furnish these valves with rolled bronze studs and bolts, together with brass hand-wheel and Navy Standard flanges. English instead of American Standard threads or flanges will also be furnished if desired. Prices on application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES.

Medium Pattern.

Outside Screw and Yoke. Screw or Flange Ends.

BRASS.

For 150 Pounds Working Pressure.



Fig. 783.
Screw Ends.



Fig. 784.
Flange Ends.

The above are very high-class, heavy, compact and durable valves, and are extensively used all over the country, but especially in the Marine service. They are guaranteed for working pressures up to 150 pounds per square inch, and are warranted to give perfect satisfaction in every respect. They are similar in design and construction to our Iron Body Valves, described on pages 94 and 95.

For Navy requirements these valves are fitted with Tobin bronze bolts, brass handwheels and Navy Standard flanges. English instead of American Standard flanges or pipe threads will also be furnished if desired. Prices on application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES**Extra Heavy Pattern.****Stationary Stem. Screw or Flange Ends.****BRASS.****For 250 Pounds Working Pressure.**

Fig. 765.
Screw Ends.



Fig. 766.
Flange Ends.

A more desirable Gate Valve than the "Victor" Extra Heavy Pattern can not be had anywhere. They are very strong, durable and are practical. Being double-seated, pressure can be taken from either end, and the valve can be packed under pressure when wide open. The material is such as is required by the United States Navy and the workmanship is beyond criticism. They are fully guaranteed for 250 pounds working pressure.

For Navy requirements the valves are furnished with Tobin bronze bolts, brass handwheels and Navy Standard flanges. They can be had with tongued and grooved flanges or with English instead of American Standard pipe threads or flanges. Flanges of the same diameter as American Heavy Standard can also be had if desired. Unless otherwise specified, they will be furnished with our Extra Heavy Standard of brass flanges, iron handwheels and steel bolts with bronze nuts.

Prices on application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
DOUBLE-SEATED "VICTOR" GATE VALVES.

Extra Heavy Pattern.

Outside Screw and Yoke. Screw or Flange Ends.

BRASS

For 250 Pounds Working Pressure.



Fig. 786.
Screw Ends.



Fig. 787.
Flange Ends.

The fact that these valves are extensively used in the Navy is in itself sufficient proof of their superiority. This design of valve with Outside Screw and Yoke is preferable to the style with Internal Screw, as the threads on the stem are not affected by the steam and are also accessible for oiling.

These valves are guaranteed for working pressures up to 250 pounds per square inch.

For Navy requirements the valves are furnished with Tobin bronze bolts, brass handwheels and Navy Standard flanges. They can be had with tongued and grooved flanges or with English instead of American Standard pipe threads or flanges. Flanges of the same diameter as American Heavy Standard can also be had if desired. Unless otherwise specified, they will be furnished with our Extra Heavy Standard of Brass flanges, iron handwheels and steel bolts with bronze nuts.

Prices on application.

All genuine valves have the name LUNKENHEIMER cast on the body.

**LUNKENHEIMER
ENGINE THROTTLE VALVES.**

PATENTED.

Iron Body Brass Mounted.

**With Renewable Seat and Interior By-Pass and with Screw,
Flange or Screw and Flange Ends.**



Fig. 402.
Screw Ends.



Fig. 651.
Screw and Flange Ends.



Fig. 403.
Flange Ends.

We illustrate herewith our Iron Body Brass Mounted, Single Disc Gate Valves, which have certain exclusive features of construction, making them especially well adapted for use as engine throttles. They have been adopted by a number of the leading engine builders as their standard throttle valves, and wherever used have given the very best satisfaction, and for many excellent reasons have been found superior to other styles of valves commonly used for this purpose.

An inspection of the engravings above will show their exterior construction, and the compactness and strength of their design will at once be apparent. The hub and body parts of the valves are held together by means of a steel band which surrounds the body and passes through the lugs in the sides of the hub, and is fastened by means of nuts. This construction is strong and secure, and permits of access to the interior of the valve for examination and repairs.

The joint between the hub and the body is indestructible, and consists of a seamless copper gasket firmly imbedded in the top part of the flange of the body, and making the bearing between it and the hub when they are held together by the band.

The discs are made of bronze and without by-pass on the 2, 2½ and 3-inch sizes, above which they are made of iron, with bronze seat ring, and fitted with automatic by-pass.

Engine Throttle Valves.—Continued.

The construction of our By-pass makes it an ideal one, inasmuch as it can not be affected by expansion or contraction of the body. It is operated by the same handwheel that operates the main valve, which is quite a desirable feature. The areas through the by-pass are sufficiently large to admit of the free flow of steam through same, quickly equalizing the pressure on either side of the main disc.

The use of a by-pass not only makes the valve easier to operate, but it also largely increases the durability of the valve, and there is less danger to be feared from "water-hammer." Although operated by the main handwheel, the by-pass forms a tight seat when the valve is closed, and can not leak. It does not sacrifice in any way the absolute control of the disc movement, and the valve can be opened or closed very rapidly.

All parts of the valve are made to templets and gauges, and therefore any worn but or broken part can easily be replaced.

The valve is heavy and substantial in every respect, and we guarantee it to be exactly as represented. We are prepared to furnish this style of valve with screw, flange or screw and flange ends, and also in Medium and Heavy Patterns, the former of which is intended for working pressures up to 125 pounds, while the latter is guaranteed for pressures not exceeding 150 pounds.

They can be furnished with lever for quick operation if desired, at a special discount from price list below. When ordering be sure to specify what style is desired, also whether Medium or Heavy Pattern is wanted.

The arrow on the body indicates the direction of flow of steam, and the valve should be connected accordingly.

PRICE LIST.

Size,..... inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
Screw Ends, .....each	15 50	19 00	23 00	28 00	34 00	40 00	49 00	57 00	66 00	87 00	99 00	120 00	140 00
Flange Ends,.....each	15 50	19 00	23 00	28 00	34 00	40 00	49 00	57 00	66 00	87 00	99 00	120 00	140 00
Screw and Flange Ends, .....each	15 50	19 00	23 00	28 00	34 00	40 00	49 00	57 00	66 00	87 00	99 00	120 00	140 00
Add to above list for each Flange for Heavy Pattern, .....each	1 35	1 50	1 65	1 85	2 05	2 35	2 65	3 35	3 90	4 25	4 65	5 10	6 60
Add to list of Valves, when wanted with Semi-Finished Hand Wheel and Finished Nuts and Edge of Flange,.....each	3 50	3 80	4 20	4 60	4 80	5 30	5 50	5 90	6 60	7 70	9 20	10 50	12 50

See page 424 for general dimensions.

All genuine valves have the name LUNKENHEIMER cast on the body.

**LUNKENHEIMER
TUYERE VALVES.****BRASS OR IRON.**

Fig. 742.
Plain Pattern.
BRASS.



Fig. 743.
With Hood.
IRON.

Above are shown two forms of what are known as Tuyere Valves, which are extensively used on copper smelters. There is nothing flimsy or light about the construction of these, as they are well made and have always been satisfactory to users.

As this is a special article, for which the sizes are not standard, we will be glad to correspond with any one regarding them, and upon receipt of specification will be pleased to submit drawings showing exactly what we can furnish. We have made these of both brass and iron, and, when writing, specify which is required. We will also be pleased to furnish dimensions and prices of the sizes which we are now prepared to furnish.

All genuine Tuyere Valves have LUNKENHEIMER cast on same.

LUNKENHEIMER
DOUBLE DISC GATE VALVES.

Rising Stem.

BRASS.



Sectional.

Lunkenheim Double Disc Gate Valves have lately been redesigned and reconstructed, and we can safely recommend their use to the trade, knowing that they are positively the best valves of their class obtainable. They are very heavy and substantial throughout, and the body is so designed as to overcome any strain that may be caused by the wedge action of the discs.

The faces of the discs and the seats in the body are carefully and accurately machined to the correct tapers. The principle on which the discs are seated makes them self-adjusting, and they will readily accommodate themselves to scale or sediment which might lodge on one of their seats, so that at least one disc will close tight at all times, and the valves can be relied upon to close off positively. This important function of the discs is accomplished by means of a ball and socket bearing between them, which permits of sufficient play in any direction and also makes the valves easy to operate, there being positively no danger of the discs sticking and becoming inoperative. The stuffing-boxes can be packed when the valve is wide open and under pressure.

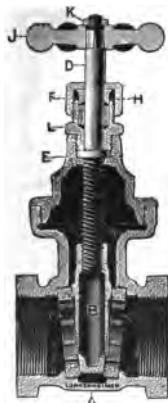
Our valves are made of the very best grade of bronze composition. They are well finished and are made in two weights, for pressures up to 150 pounds and 300 pounds per square inch, respectively. As these valves are double-seated, they will take pressure from either end.

We are prepared to supply these valves with brass wheels or special dimension flanges. Prices upon application. They can also be had with English instead of American pipe threads and flanges, if desired.

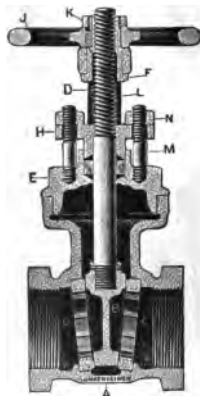
All genuine valves have the name LUNKENHEIMER cast on the bodies.

LUNKENHEIMER
WEDGE DISC GATE VALVES.

BRASS.



**Sectional View of Valve,
with Stationary Stem.**



**Sectional View of Valve,
with Outside Screw and Yoke.**

Illustrated above and listed on the following pages are the Lunkenheim Wedge Disc Gate Valves, which are made in two styles, viz.: with Stationary Stem or Outside Screw and Yoke, and are warranted for 150 pounds working pressure per square inch.

The large sale of the above during the past few years has demonstrated the fact that this type of valve is appreciated, especially among the Marine trade, where it is preferable that brass instead of iron valves be employed.

Owing to our improved facilities, we are enabled to insure a practical and durable construction, and the valves are guaranteed to be absolutely tight. They are rigidly tested and carefully inspected before shipment, and every possible precaution is taken to prevent defective goods leaving the factory.

Wedge Disc Gate Valves.—Continued.

A feature of great importance is that of the renewable seats C, which, when worn, can easily and cheaply be replaced with a new set, thereby making the valve very durable. To renew the seats is not possible with all makes of valves for the reason that the parts which receives the rings are not threaded to the correct angle of the disc taper, hence it is necessary that the rings be faced off after the same have been screwed in the body, which the manufacturers alone can do. When machining the interior of our valve bodies, special precaution is taken to taper the parts which receive the seats exactly to the angle of the disc, and therefore it is only necessary that the rings be faced off straight to insure the correct degree of taper, when the same are placed in the body.

To suit the various requirements as to design, the valve is made in the two forms shown on opposite page. Of the two forms, the one shown to the right, constructed with outside screw and yoke, is to be preferred in the majority of cases, owing to the non-exposure of the threads on the operating stem D, to the damaging effect of the steam and also because of the facilities for oiling the threads at any time, hence making the same durable and insuring the easy operation of the valve.

Both forms of valve, however, are well made throughout, being very strong and durable and the material is a bronze composition such as is required by the United States Navy. As the valves are double seated, they will take pressure from either end, and when open to their greatest extent, the stuffing boxes can be repacked while the pressure is on.

For special requirements, our Wedge Disc Gate Valves are made with one end screwed and the other flanged, and if desired, English instead of American Standard pipe thread or flanges can be had. At a special discount from price list the valves are furnished with Navy Standard flanges and brass hand wheels.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER MEDIUM PATTERN WEDGE DISC GATE VALVES.

Stationary Stem; Screw, Flange or Screw and Flange Ends.

BRASS.



Fig. 768.
Screw Ends.



Fig. 770.
Screw and Flange Ends.



Fig. 769.
Flange Ends.

See pages 124 and 125 for a complete description of the above. These valves are suitable for a working pressure of 150 pounds.

When so ordered they can be had with English instead of American Standard Pipe Threads and Flanges. They can also be furnished with Navy Standard Flanges and Brass Hand-wheels. Prices on application.

PRICE LIST.

Size.....each	$\frac{3}{8}$ "	$\frac{1}{2}$ "	$\frac{3}{4}$ "	1	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Medium Pattern, Stationary Stem, Screw Ends, Fig. 768.....each	1 70	1 80	2 30	3 00	4 20	6 00	9 00	17 00	24 00
Medium Pattern, Stationary Stem, Flange Ends, Fig. 769.....each	3 50	3 70	4 60	5 90	8 10	11 00	16 00	29 00	39 00
Medium Pattern, Stationary Stem, Screw and Flange Ends, Fig. 770.....each	2 90	3 00	3 80	4 90	6 80	9 30	13 50	25 00	34 00
Medium Pattern, Stationary Stem, Finished all over with Brass Hand Wheel, Screw Ends, Fig. 769.....each	.....	3 20	3 80	5 10	6 90	9 00	13 50	.....	.....
Medium Pattern, Stationary Stem, Finished all over with Wood Hand Wheel, Fig. 268.....each	.....	3 00	3 60	4 80	6 50	8 30	13 00	.....	.....

For general dimensions see lists on pages 427.

All genuine valves have the name LUNKENHEIMER cast in the valve shell.

LUNKENHEIMER
MEDIUM PATTERN WEDGE DISC GATE VALVES.
Outside Screw and Yoke; Screw, Flange or Screw and Flange Ends.
BRASS.



Fig. 831.
Screw Ends.



Fig. 833.
Screw and Flange Ends.



Fig. 832.
Flange Ends.

The Lunkenheim Medium Pattern Wedge Disc Gate Valves with Outside Screw and Yoke illustrated above are guaranteed to stand a working pressure of 150 pounds per square inch.

The above is the preferable form of valve inasmuch as the threads on the stem do not come in contact with the stem, and can be oiled, features which prolong the life of the stem and make the valve more durable. The stem also acts as an index to the degree of opening of the valve.

The above are furnished with Navy Standard Flanges and Brass Wheels at a special discount from price list below. If desired, English instead of American Standard Pipe Threads and Flanges can be had.

See pages 124 and 125 for a description of the above.

PRICE LIST.

Size .....inches	½	¾	1	1½	1½	2	2½	3
Medium Pattern, Outside Screw and Yoke, Screw Ends, .....each	2 70	3 50	4 50	6 30	9 00	14 00	25 00	36 00
Medium Pattern, Outside Screw and Yoke, Flange Ends, .....each	5 50	6 90	8 80	12 00	16 50	24 00	43 00	58 00
Medium Pattern, Outside Screw and Yoke, Screw and Flange Ends, .....each	4 50	5 70	7 30	10 00	14 00	20 00	37 00	51 00

For general dimensions see lists on page 427.

All genuine valves have the name **LUNKENHEIMER** cast in the valve shell.

LUNKENHEIMER
"HANDY" GATE VALVES.

PATENTED.

Brass, Iron Body Brass Mounted and All Iron.
Screw Ends Only.



Fig. 430.
Brass.



Fig. 628.
Iron.



Sectional.
Showing Discs, Ball Joint, Stem
and Packing.



Interior.
Showing Movement of Discs.

The "Handy" Valve is designed for Low Pressure Steam, Water, Gas, Oils, etc., for use in Oil Refineries, Breweries, Tanneries, Pulp and Chemical Fibre Mills, Soap, Varnish and White Lead Works, Creameries, Canning and Packing Establishments; also on Low Pressure Steam, Hot Water Heating and Fire Extinguishing Apparatus, Laundry and Wool Washing Machinery, Railroad Water Stations, etc., and wherever a Lever Quick-opening Valve is wanted for pressures not above 75 pounds.

LUNKENHEIMER
"HANDY" GATE VALVES.

PATENTED.

For Pressures not to Exceed 75 Pounds.

DESCRIPTION.

The discs are secured to the operating stem and adapted to close against tapering seats in the valve shell, and being provided with ball and socket bearings at their backs, are evenly wedged against the seats when the valve is closed by the lever. This is the only practical way to construct lever quick opening valves, as we have found out after years of actual experience. The discs make a tight joint, will not jar open, are under perfect control of the detachable lever and will remain stationary at any desired opening.

The stem is provided with a tapering flange upon which bears a non-rotating friction washer. Upon this washer and bearing down on the flange of stem, the packing is compressed in the usual way by the packing nut. Any necessary friction can be brought to bear on the flanged stem, making the valve work easy or hard; thus the discs will not change position when set at a certain degree of opening. The "Handy," when open, presents a full and unobstructed passage, is simple, light in weight, compact, practical in operation, low in price and for many purposes better adapted than gate valves with wheel handle. The "Handy" can be operated by a rod or rope from a distance. When ordering specify LUNKENHEIMER, and see that you get them. None genuine unless "Lunkenheimer" is cast in the shell.

We make a special heavy steam valve of this kind, intended for higher pressures, which makes the ideal Throttle for Traction Engines. This pattern we call our Lever Throttle Valve. See pages 130 and 131.

PRICE LIST.

Screw Ends Only, Not Made With Flange Ends.

Size..... Inches	$\frac{1}{8}$	$\frac{1}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	8
Brass Body, Fig. 430 each	1 60	1 80	2 50	3 50	5 00	7 50	13 50	19 00	40 00	60 00	.....	.....	.....	.....
Iron Body, Brass Mounted, Fig. 628 each	.....	.....	.....	.....	.....	7 00	12 00	15 00	18 00	21 00	25 00	30 00	35 00	65 00
All Iron, Fig. 322 each	.....	3 40	4 00	4 50	6 00	7 00	12 00	15 00	18 00	21 00	25 00	30 00	35 00	65 00

The "Handy" is also made in Acid Metal at a special discount off Brass List; also furnished threaded for casing pipe, or with English Standard Pipe Threads.

For general dimensions see list on page 428.

LUNKENHEIMER
LEVER THROTTLE VALVES.
SPECIAL HEAVY PATTERN FOR HIGH PRESSURES.

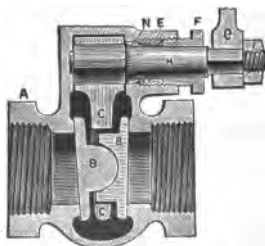
PATENTED.



Fig. 431.
Brass Body.



Fig. 432.
Iron Body Brass Mounted.



Sectional.

DESCRIPTION.

A—Valve Shell.
BB—Discs with Ball Joint.
CC—Oscillating Carrier.
E—Packing.
F—Stuffing-box Gland.

G—Lever.
H—Stem for operating Carrier C.
I—Nut to fasten Lever.
N—Non-rotating Washer bearing against beveled Flange on Stem.

LUNKENHEIMER
LEVER THROTTLE VALVES.

PATENTED.

DESCRIPTION.

This valve is especially adapted as a "Throttle" for Traction Engines, Saw Mills, etc., and wherever a compact, simple, durable and reliable Quick-Opening Valve is wanted. It may be operated by the handle or rod attachment, and is so balanced that it can be set at any desired opening. It is constructed of few parts, and therefore will not get out of order. The discs being loose and provided with ball and socket bearings, wear evenly and make a tight joint. We have found after years of actual experience that the only practical manner in which to construct lever quick-opening valves is to wedge the discs between tapering seats in the valve shell by means of a ball and socket bearing between them as shown in sectional cut. All valves are thoroughly tested before leaving the factory.

The Brass Valves are guaranteed for working pressures up to 175 pounds, while our Iron Body Brass Mounted Valves are guaranteed for working pressures not to exceed 150 pounds.

They are in practical use and adopted by the leading Traction Engine Builders throughout the United States. When ordering, specify LUNKENHEIMER, and see that you get them. None genuine unless "Lunkenheimer" is cast in the shell.

PRICE LIST.

BRASS.

Size,.....inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$
Brass Body,.....each	3 00	4 00	5 00	7 00	10 00	19 00

All Brass Valves are provided with Gun Metal Disc Carriers (C).

IRON.

Brass Mounted.

Size,.....inches	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	5	6
Iron Body, Brass Mounted, .....each	8 50	16 00	20 00	25 00	30 00	35 00	40 00

Screw Ends Only, not Made with Flange Ends.

For general dimensions see list on page 429.

LUNKENHEIMER HOSE GATE VALVES.

On the following pages are illustrated the various forms of Hose Gate Valves which we are prepared to furnish and which were designed to fill all existing requirements for valves of this kind. The same careful workmanship will be found throughout all our various types, and the valves present that neat and finished appearance not to be found in any other make.

The material is of the very highest grade, the iron used being hard and close grained, while the bronze is of the very best composition.

The valves will stand long and severe usage, inasmuch as they are designed with a view to strength and durability, and they are fully guaranteed to give satisfactory results.

Iron body valves with brass trimmings, or brass body valves can be had as desired, together with either single or double hose connections, and by referring to the following pages, we feel assured that the trade will readily find among our various patterns the design particularly suited for their special requirements.

We can also furnish any of our designs of Hose Gate Valves with English instead of American Standard Pipe Threads and Flanges, and with or without cap and chain as desired. All bronze valves with Navy Standard Flange and Hose Threads can be furnished when so ordered. Prices on application.

When ordering be sure to specify whether wanted with or without cap and chain, and also clearly designate the diameter and number of the male threads for hose connection. There are a number of standards as regards Hose Threads, and unless the dimensions are given we cannot fill the order. All Hose Valves will be furnished with female pipe thread on inlet end unless otherwise specified, though they can be had with flange or with female hose thread on inlet to be screwed directly onto hydrant.

The following is a table of the Lunkenheimer Standard of Hose Threads which have been adopted by quite a number of concerns.

THE LUNKENHEIMER STANDARD OF HOSE THREADS.

Size of Valve.....Inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Diameter at top of Thread.....Inches	$\frac{7}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	2	2 $\frac{1}{8}$	2 $\frac{3}{8}$	3 $\frac{1}{8}$
Number of Threads.....per Inch	14	11	11 $\frac{1}{2}$	11	11	7	7	6 $\frac{1}{2}$

All of our products are rigidly tested and carefully inspected before they leave the factory, the stuffing boxes are packed and the valves are ready for immediate use.

All genuine valves have LUNKENHEIMER cast in the shell of same.

LUNKENHEIMER
"CLIP" HOSE GATE VALVES.

PATENTED.

Iron Body Brass Mounted.

For 100 Pounds Working Pressure.



Fig. 668.
Screw End.

This Hose valve will be found unexcelled for all places where the pressure does not exceed 100 pounds. It is compact and neat in appearance, and can be furnished either with or without the cap and chain, but will always be sent without unless otherwise specified. In ordering always send dimensions or sample of Hose Thread required. This valve is well made in every particular; has male hose nipple, made of brass, which is permanently fastened in the valve shell, and all valves are fully guaranteed.

See pages 91, 92 and 132 for a further description.

PRICE LIST.

Size.....inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
I. B. B. M. without Cap and Chain.....each	1 90	2 50	3 50	5 00	7 50	14 00	20 00
Finished Brass Cap and Chain .....extra, each	1 00	1 20	1 60	2 25	3 25	5 00	6 00

For dimensions of valve without hose thread, see page 411.

All genuine valves have LUNKENHEIMER cast in the valve shell.

LUNKENHEIMER
MEDIUM PATTERN WEDGE DISC HOSE
GATE VALVES.

Stationary Stem. Screw or Flange End.

BRASS.



Fig. 774.
Screw End.



Fig. 775.
Flange End.

These valves are similar in construction to those shown on page 126, excepting that they are of the Hose Pattern. They can be furnished with cap and chain, though they are furnished without unless otherwise ordered, and are suitable for pressures up to 150 pounds per square inch. They make ideal hose valves, as their construction embodies all desirable features required in valves of this kind. Valves with Navy Standard flange, caps and hose threads, and fitted with brass wheels, can be had at a special discount from lists below.

See page 132 for a further description of Hose Gate Valves, and for a complete description of the valve without hose thread see pages 124 and 125.

PRICE LIST.

Size,	inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Screw End, without Cap or Chain, Fig. 366,.....	each	2 50	3 30	4 60	6 60	9 90	18 50	26 50
Flange End without Cap or Chain, Fig. 365,.....	each	4 20	5 40	7 50	10 50	15 00	27 50	37 00
Screw End with Cap and Chain, Fig. 774,	each	3 40	4 40	6 20	8 60	13 00	23 00	32 00
Flange End with Cap and Chain, Fig. 775,.....	each	5 00	6 60	9 10	12 50	18 00	32 00	42 00

For general dimensions of these valves without hose thread, see page 427.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
MEDIUM PATTERN WEDGE DISC HOSE
GATE VALVES.

Outside Screw and Yoke. Screw or Flange End.

BRASS.



Fig. 837.
Screw End.



Fig. 838.
Flange End.

The above is a very desirable form of Hose Gate Valve; is very strong and durable, and is acknowledged the best valve of its kind on the market. See page 132 for a description of our Hose Gate Valves in general, and page 124 for a complete description of our Wedge Disc Gate Valves without Hose Threads.

The above, being our Medium Pattern, are suitable for working pressures up to 150 pounds; they can be packed under pressure, and as the stem rises with the disc, the degree of opening of the valve is clearly indicated by the stem.

These valves can be had Navy Standard, as regards Flange and Hose Thread dimensions, and are fitted with brass hand wheels, at a special discount from price list below.

When ordering be sure to specify whether inlet is wanted screw or flange, with or without cap, and also give the dimensions of the hose thread, or send sample.

PRICE LIST.

Size,	Inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Screw End without Cap and Chain, Fig. 362,.....	each	3 90	5 00	6 90	9 90	15 50	27 50	40 00
Flange End, without Cap and Chain, Fig. 361,.....	each	6 30	8 00	11 00	15 50	22 00	41 00	56 00
Screw End, with Cap and Chain, Fig. 837,.....	each	4 80	6 60	8 50	12 00	18 50	32 00	45 00
Flange End, with Cap and Chain, Fig. 838,.....	each	7 20	9 10	12 50	17 50	25 00	45 00	63 00

*For general dimensions of these valves without Hose Thread, see page 427.
All genuine valves have the name LUNKENHEIMER cast on the valve shell.*

LUNKENHEIMER
UNDERWRITERS' PATTERN HOSE GATE VALVES.

Iron Body Brass Mounted.

Screw or Flange End. Stationary Stem.



Fig. 394.
Screw End.
Without Cap and Chain.



Fig. 393.
Flange End.
Without Cap and Chain.

The above were designed particularly to suit the requirements of the National Board of Fire Underwriters and the Associated Factory Mutual Insurance Companies, and will be found to comply in every respect with their rules.

They are made in two styles, as shown above, with screw ends, or with suitable lugs for bolting same to hydrant with two $\frac{3}{4}$ -inch tap bolts. The valves are strong and substantial in every respect, the bodies being made of hard close-grained iron, while the trimmings are of the very best grade of bronze composition, and we guarantee them for working pressures of 150 pounds per square inch. The bodies are provided with male-threaded brass nipples which are permanently fastened in the valve shell. When ordering be sure to specify the diameter of the hose thread, also giving the number of threads per square inch, or, when possible, send sample.

See page 132 for a further description of Hose Gate Valves.

PRICE LIST.

Size, .....	.....inches	2½
Valve without Cap and Chain, Screw End, Fig. 394,.....	each	12 00
Valve without Cap and Chain, Flange End, Fig. 393,.....	each	14 00
Valve with Cap and Chain, Screw End, Fig. 355,.....	each	17 00
Valve with Cap and Chain, Flange End, Fig. 354,.....	each	20 00

Dimensions furnished upon application.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
QUICK OPENING HOSE VALVES.

BRASS.



Fig. 741.

The above is an ideal form of hose valve, and by a number of users is greatly preferred to any of the other forms. It is made entirely of bronze, the composition of which is the very highest grade, and the entire construction is such that the valve will stand long and severe usage.

The principal advantage of this valve is its quick-opening feature, which is very simple in construction and operates as follows: One end of a chain is attached to the hinged hook forming part of the yoke and the other end is secured to the hose in such a manner that the length of the hose between the valve and the chain connection is considerably longer than the chain. Therefore, as the hose is drawn taut, a pull on the hook naturally results, which disengages the hook from the cross bar of the hinged yoke. This removes the pressure on top of the disc stem, and owing to the pressure on the bottom of the disc the same rises and throws the hinged yoke to one side.

When it is desired to close the valve, the yoke stem is unscrewed as far as possible, which permits the replacing of the yoke, after which the yoke stem is screwed down on top of the disc stem until the disc is firmly seated.

The disc is well guided at both the top and bottom, and will at all times properly seat itself. Should the seat wear, the valve can quickly and easily be reground. As there are quite a large number of Hose Thread Standards, it is necessary that the dimensions of the threads be given, or a sample be sent when ordering.

If required, these valves are furnished with cap and chain, though unless otherwise specified they are furnished without.

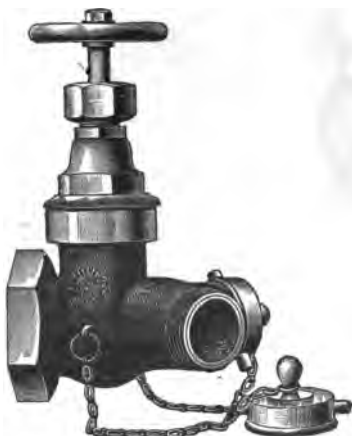
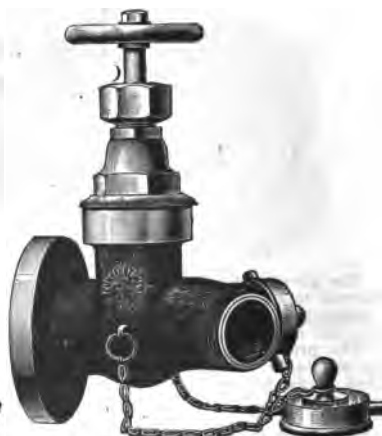
For a general description of our other forms of Hose Valves see page 132.

Our Quick-Opening Hose Valves are guaranteed for working pressures up to 200 pounds per square inch.

PRICE LIST.

Size,.....	1¼	1½	2	2½
Quick Opening Hose Gate Valve, Screw Ends, .....each	6 20	7 90	11 50	16 00

All genuine valves have the name LUNKENHEIMER cast in the valve body.

LUNKENHEIMER**MEDIUM PATTERN WEDGE DISC SIAMESE HOSE
GATE VALVES.****Stationary Stem.****Screw or Flange Ends.****BRASS.****Fig. 843.****Screw End with Cap and Chain.****Fig. 844.****Flange End with Cap and Chain.**

See page 132 for a general description of Lunkenheimier Hose Gate Valves. With the exception that the above are provided with hose threaded end, they are identically like the valve with Stationary stem described and illustrated on pages 124 and 125.

They are well designed, and the inlet is of ample area to supply the two outlets. They are guaranteed for working pressures not exceeding 150 pounds per square inch.

We are also prepared to make other forms of Siamese Hose Gate Valves in which the outlets have independent gates, instead of a single gate controlling both outlets.

The above are also made with Navy Standard flanges and hose threads and are furnished with brass hand wheels when so ordered.

Prices on application.

For general dimensions of the above without hose threads, see page 427.

All genuine Valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
MEDIUM PATTERN WEDGE DISC SIAMESE HOSE
GATE VALVES.

Outside Screw and Yoke.

Screw or Flange Ends.

BRASS.



Fig. 847.
Screw End with Cap and Chain.

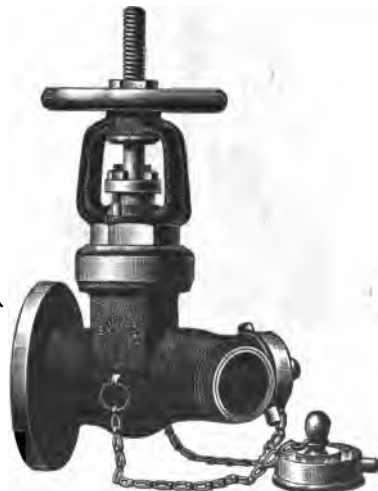


Fig. 848.
Flange End with Cap and Chain.

The above form is to be preferred to that on opposite page, inasmuch as the threads on the stem, being accessible for oiling, are more durable. As the stem rises with the disc, it acts as an indicator clearly showing the degree of opening of the disc.

We are prepared to furnish these valves with independent gates for the two outlets instead of a single gate controlling both openings. They can also be had with Navy Standard flanges, and hose threads, and with brass hand wheels.

Prices furnished on application.

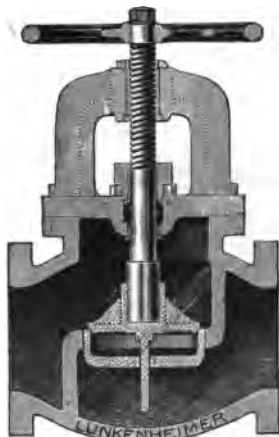
See pages 132 for a general description of LUNKENHEIMER Hose Gate Valves. Pages 124 and 125 illustrate and describe in detail the above without hose threads.

For general dimensions of the above without hose threads, see page 427.

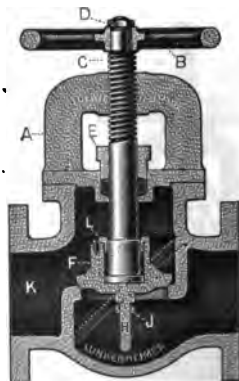
All genuine Valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

SCREW DOWN CHECK VALVES.



Sectional View of Screw Down Check Valve. Horizontal Pattern. Iron Body Brass Mounted.



Sectional View of Screw Down and Lift Check Valve. Horizontal Pattern.

The growing demand in the past few years for Screw Down Check Valves has induced us to enter into the manufacture of a complete line of these valves, and we are now in a position to supply our trade with any style of Screw Down Check Valve desired, with the assurance that perfect satisfaction will be the result of their use.

In designing these valves we have profited by half a century's experience of close observation and constant experimenting in the manufacture of Engineering Appliances, to the end that our Screw Down Check Valves will be found to contain all the necessary features that go to make up a strong, durable and practical construction.

We are prepared to furnish both Brass and Iron Body Brass Mounted Valves. The material used is the best obtainable, the iron being hard and close grained, while the bronze composition is of the very highest grade.

Screw Down Check Valves.—Continued.

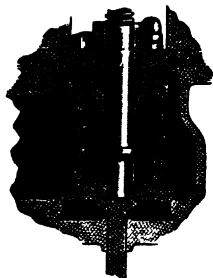
The workmanship is unequalled, all the wearing parts are well machined, the threads are full and perfect, and we guarantee our valves to give perfect satisfaction in every respect.

All styles of our Screw Down Check Valves can be readily reground without necessitating their removal from the pipes, and the stuffing-box can also be packed while the pressure is on with the stems unscrewed to their limit.

Referring to the sectional view on opposite page, to the left, it will be seen that the disc is well guided at both top and bottom, and the construction is such that it will at all times properly seat itself and will not stick, pound or leak. By means of the operating stem, the lift of the disc can be regulated to any degree of opening, or the disc can be held firmly to its seat if desired.

The sectional view on opposite page, to the right, illustrates our Combined Screw Down and Lift Check Valve, which is a very desirable form of valve where it is at times necessary to hold the valve wide open.

The small sectional view herewith illustrates our Screw Down Check Valve fitted with a strong and durable bronze spring. The addition of this spring aids the disc in seating, and in some cases is indispensable.



**Detail Sectional View
Showing Screw Down
Check Valve with
Spring.**

Our standard construction, however, is that shown on the opposite page, to the left, and all of our valves are furnished as there shown, unless otherwise specified. The price lists on the following pages are only for valves constructed in this manner, but we would be pleased to furnish prices for any of the other designs of valves. While we illustrate and list our Cross Screw Down Check Valves with the same size pipe connections on the three ends, we are also prepared to furnish same with enlarged or reduced inlet or outlet, as desired.

Our Screw Down Check Valves are thoroughly tested and inspected before they are permitted to leave the factory, and we can safely recommend their use to the trade.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

MEDIUM PATTERN REGULATING CHECK VALVES.

Screw Ends.

BRASS.



Fig. 595.
Screw Ends.

Where it is desired to control the lift of check valve discs, to meet the varying conditions of the service to which the valves are adapted, we can furnish the above for pressures not exceeding 200 pounds per square inch.

English instead of American Standard Pipe Threads are furnished when so ordered. See pages 140 and 141 for further description.

PRICE LIST.

Size, .....inches	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Medium Pattern, Screw Ends,.....each	70	85	1 15	1 45	2 00	2 80	3 90	6 20	12 00	16 50

For general dimensions see page 390.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
EXTRA HEAVY PATTERN REGULATING CHECK
VALVE.

Screw Ends.

BRASS.



Fig. 754.
Screw Ends.

These Valves are warranted to stand a working pressure of 300 pounds per square inch.

English instead of American Standard pipe threads are furnished when so ordered. See pages 140 and 141 for a general description of Regulating Check Valves.

PRICE LIST.

Size,.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Extra Heavy Pattern, Screw Ends,.....each	1 50	2 30	3 60	5 10	7 10	10 90	19 50	29 00

*All genuine valves have the name LUNKENHEIMER cast on the valve shell.
For general dimensions see page 391.*

**LUNKENHEIMER
SCREW DOWN CHECK VALVES.****Medium Pattern.****Globe, Angle and Cross Patterns, with Outside Screw and Yoke.****Screw Ends.****For 150 Pounds Working Pressure.****BRASS.****Fig. 193.
Globe Pattern.****Fig. 191
Cross Pattern.****Fig. 192.
Angle Pattern.**

The above are guaranteed for working pressure up to 150 pounds per square inch. When so ordered, they can be furnished with English instead of American Standard Pipe Threads.

See pages 140 and 141 for general description of Screw Down Check Valves.

PRICE LIST.

Size.....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Medium Pattern Globe, Screw Ends,.....each	11 60	13 50	22 00	33 00	45 00	59 00	74 00	93 00	125 00	190 00	255 00
Medium Pattern Angle, Screw Ends,.....each	11 60	13 50	22 00	33 00	45 00	59 00	74 00	93 00	125 00	190 00	255 00
Medium Pattern Cross, Screw Ends,.....each	13 50	15 00	26 00	39 00	53 00	70 00	86 00	100 00	145 00	215 00	295 00

For general dimensions see list on page 394.

All genuine Valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
SCREW DOWN CHECK VALVES.

Medium Pattern.

Globe, Angle and Cross Patterns with Outside Screw and Yoke.

Flange Ends.

For 150 Pounds Working Pressure.

BRASS.



Fig. 190.
Globe Pattern.



Fig. 188.
Cross Pattern.



Fig. 189.
Angle Pattern.

The above are guaranteed for working pressure up to 150 pounds per square inch. When so ordered, they can be furnished with English instead of American Standard Flanges.

See pages 140 and 141 for general description of Screw Down Check Valves.

PRICE LIST.

Size,..... inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Medium Pattern Globe, Flange Ends,.....each	19 50	23 50	34 00	46 00	62 00	76 00	93 00	115 00	145 00	210 00	290 00
Medium Pattern Angle, Flange Ends,.....each	19 50	23 50	34 00	46 00	62 00	76 00	93 00	115 00	145 00	210 00	290 00
Medium Pattern Cross, Flange Ends,.....each	24 50	28 50	40 00	55 00	74 00	90 00	100 00	135 00	175 00	245 00	335 00

*For general dimensions see list on page 394.
All Genuine Valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER SCREW DOWN CHECK VALVES.

Extra Heavy Pattern.

Globe, Angle and Cross Patterns, with Outside Screw and Yoke.

Screw Ends.

For 300 Pounds Working Pressure.

BRASS.



Fig. 184.
Globe Pattern.



Fig. 182.
Cross Pattern.



Fig. 183.
Angle Pattern.

The above are guaranteed for working pressure up to 300 pounds per square inch. When so ordered, they can be furnished with English instead of American Standard Pipe Threads.

See pages 140 and 141 for general description of Screw Down Check Valves.

PRICE LIST.

Size. ....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Extra Heavy Pattern Globe, Screw Ends,.....each	17 00	21 00	30 00	43 00	59 00	78 00	87 00	125 00	155 00	225 00	315 00
Extra Heavy Pattern Angle, Screw Ends,.....each	17 00	21 00	30 00	43 00	59 00	78 00	87 00	125 00	155 00	225 00	315 00
Extra Heavy Pattern Cross, Screw Ends,.....each	22 00	25 00	35 00	51 00	71 00	91 00	115 00	145 00	180 00	260 00	390 00

⁴ For general dimensions see list on page 395.

All Genuine Valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
SCREW DOWN CHECK VALVES.

**Extra Heavy Pattern,
Globe, Angle and Cross Patterns, with Outside Screw and Yoke.
Flange Ends.
For 300 Pounds Working Pressure.**

BRASS.



Fig. 187.
Globe Pattern.



Fig. 185.
Cross Pattern.



Fig. 186.
Angle Pattern.

The above are guaranteed for working pressure up to 300 pounds per square inch. When so ordered, they can be furnished with English instead of American Standard Flanges, or tongued and grooved flanges can also be had. We can also furnish them with flanges of the same diameter as American Heavy Standard. Prices on application.

See pages 140 and 141 for general description of Screw Down Check Valves.

PRICE LIST.

Size,.....inches	1½	2	2½	3	3½	4	4½	5	6	7	8
Extra Heavy Pattern Globe, Flange Ends,...ca.	27 50	38 00	45 00	61 00	79 00	100 00	125 00	150 00	190 00	255 00	350 00
Extra Heavy Pattern Angle, Flange Ends...ca.	27 50	35 00	45 00	61 00	79 00	100 00	125 00	150 00	190 00	255 00	350 00
Extra Heavy Pattern Cross, Flange Ends,...ca.	36 00	43 00	55 00	74 00	94 00	125 00	145 00	175 00	220 00	300 00	405 00

For general dimensions see list on page 395.

All Genuine Valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER SCREW DOWN CHECK VALVES.

Iron Body Brass Mounted.

Globe, Angle and Cross Patterns, with Outside Screw and Yoke.
Screw Ends. Medium Pattern. For 125 Pounds Working Pressure.

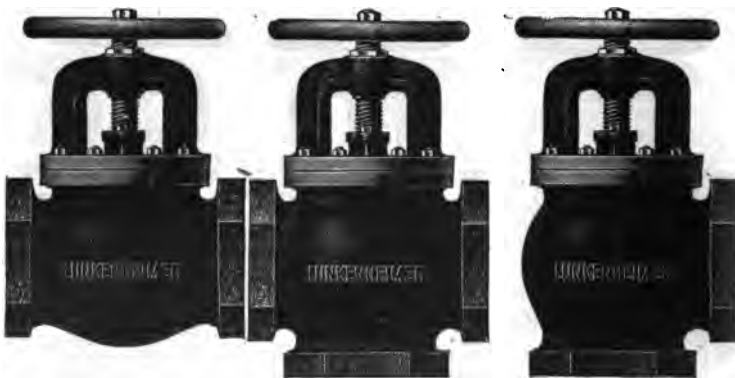


Fig. 863.
Globe Pattern.

Fig. 744.
Cross Pattern.

Fig. 864.
Angle Pattern.

Reference is had to pages 140 and 141 for a general description of screw down check Valves.

These valves are guaranteed to stand a working pressure of 125 pounds per square inch.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Medium Globe Pattern, Screw Ends, ..ea.	8 80	11 30	15 60	19 00	24 00	30 00	34 00	47 00	80 00	90 00	145 00	215 00
Medium Angle Pattern, Screw Ends, ..ea.	8 80	11 30	15 60	19 00	24 00	30 00	34 00	47 00	80 00	90 00	145 00	215 00
Medium Cross Pattern, Screw Ends, ..ea.	10 70	14 00	20 30	25 00	29 50	38 50	44 00	59 00	97 00	115 00	205 00	300 00

For general dimensions see list on page 402.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER SCREW DOWN CHECK VALVES.

Iron Body Brass Mounted.

Globe, Angle and Cross Patterns, with Outside Screw and Yoke.
Flange Ends. Medium Pattern. For 125 Pounds Working Pressure.

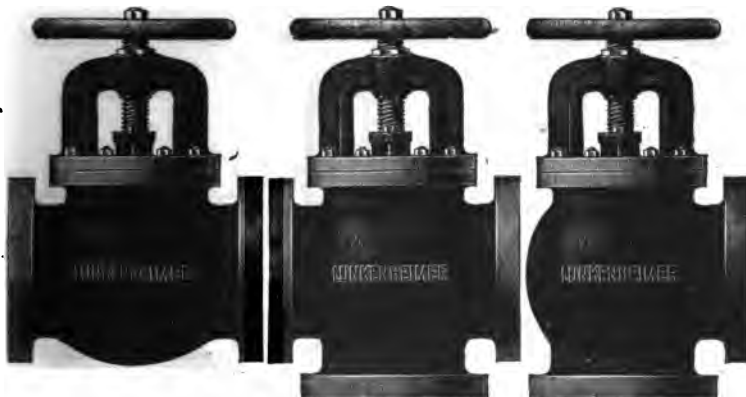


Fig. 865.
Globe Pattern.

Fig. 745.
Cross Pattern.

Fig. 866.
Angle Pattern.

These valves are intended for working pressures up to 125 pounds.
See description on pages 140 and 141.

PRICE LIST.

Size,.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Medium Globe Pattern, Flange Ends, ea.	10 80	13 50	19 00	23 00	28 00	34 50	39 00	53 00	85 00	96 00	155 00	235 00
Medium Angle Pattern, Flange Ends, ea.	10 80	13 50	19 00	23 00	28 00	34 50	39 00	53 00	85 00	96 00	155 00	235 00
Medium Cross Pattern, Flange Ends, ea.	13 80	18 00	25 00	31 00	36 00	45 00	51 00	68 00	105 00	125 00	230 00	330 00

For general dimensions see page 402.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
SCREW DOWN CHECK VALVES.

Iron Body Brass Mounted.

Globe, Angle and Cross Patterns, with Outside Screw and Yoke.
Screw Ends. Heavy Pattern. For 150 Pounds Working Pressure.

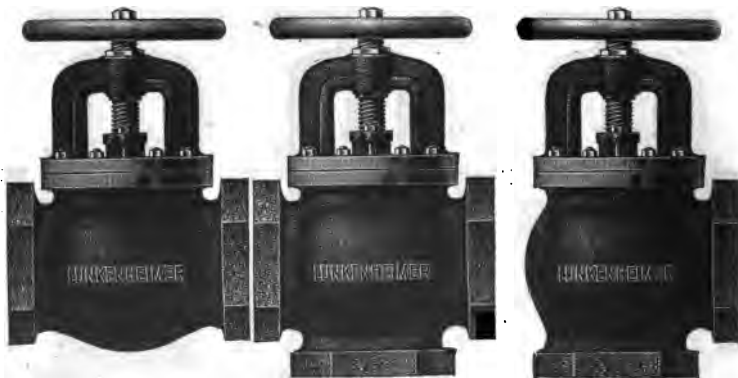


Fig. 219.
Globe Pattern.

Fig. 746.
Cross Pattern.

Fig. 218
Angle Pattern.

The above are warranted for 150 pounds working pressure.

For a complete description of screw down check valves, see pages 140 and 141.

PRICE LIST.

Size,.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Heavy Globe Pattern, Screw Ends,.....each	8 80	11 30	15 60	19 00	24 00	30 00	34 00	47 00	80 00	90 00	145 00	215 00
Heavy Angle Pattern, Screw Ends,.....each	8 80	11 30	15 60	19 00	24 00	30 00	34 00	47 00	80 00	90 00	145 00	215 00
Heavy Cross Pattern, Screw Ends,.....each	10 70	14 00	20 30	25 00	29 50	38 50	44 00	59 00	97 00	115 00	205 00	300 00

See page 403 for general dimensions.

All genuine valves have the name **LUNKENHEIMER** cast on the body.

LUNKENHEIMER
SCREW DOWN CHECK VALVES.

Iron Body Brass Mounted.

Globe, Angle and Cross Patterns, with Outside Screw and Yoke.
Flange Ends. Heavy Pattern, for 150 Pounds Working Pressure.



Fig. 869.
Globe Pattern.

Fig. 747.
Cross Pattern.

Fig. 854.
Angle Pattern.

The above being our Heavy Pattern, are guaranteed for 150 pounds working pressure.

If desired these valves can be had with tongued and grooved or male and female body flanges, with companion flanges to match. *See page 255 for extra prices.*

See description on pages 140 and 141.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Heavy Globe Pattern, Flange Ends,.....each	14 00	17 00	22 50	27 50	33 00	40 00	45 00	60 00	94 00	105 00	165 00	250 00
Heavy Angle Pattern, Flange Ends,.....each	14 00	17 00	22 50	27 50	33 00	40 00	45 00	60 00	94 00	105 00	165 00	250 00
Heavy Cross Pattern, Flange Ends,.....each	18 00	23 00	30 50	38 00	43 00	53 00	60 00	79 00	120 00	150 00	225 00	350 00

For general dimensions see page 403.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
SCREW DOWN CHECK VALVES.

Iron Body Brass Mounted.

Globe, Angle and Cross Patterns, with Outside Screw and Yoke.

Screw Ends. Extra Heavy Pattern.

For 250 Pounds Working Pressure.

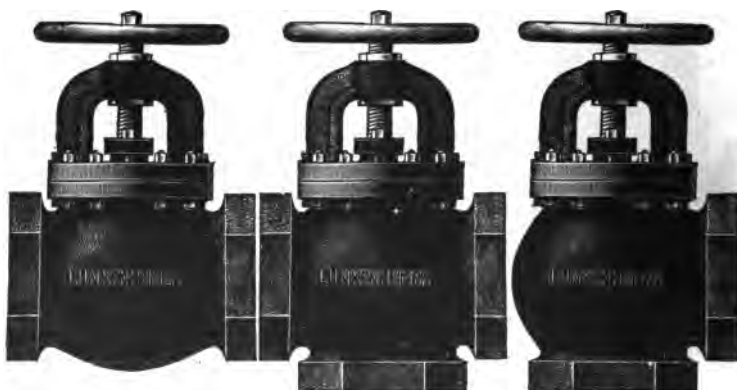


Fig. 899.
Globe Pattern.

Fig. 748.
Cross Pattern.

Fig. 916.
Angle Pattern.

The above being our Extra Heavy Pattern, are warranted to stand working pressures up to 250 pounds. If desired, they can be made of Semi-Steel, prices of which will be furnished on application.

For a description of these valves see pages 140 and 141.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Extra Heavy Globe Pattern, Screw Ends, .....each	36 00	41 00	46 00	53 00	58 00	66 00	76 00	94 00	120 00	145 00	240 00	355 00
Extra Heavy Angle Pattern, Screw Ends, .....each	36 00	41 00	46 00	53 00	58 00	66 00	76 00	94 00	120 00	145 00	240 00	355 00
Extra Heavy Cross Pattern, Screw Ends, .....each	44 00	50 00	56 00	63 00	69 00	79 00	94 00	120 00	150 00	180 00	300 00	440 00

For general dimensions see list on page 405.

All genuine valves have the name LUNKENHEIMER cast on the shell.

LUNKENHEIMER
SCREW DOWN CHECK VALVES.

Iron Body Brass Mounted.

Globe, Angle and Cross Pattern, with Outside Screw and Yoke.

Flange Ends.

Extra Heavy Pattern.

For 250 Pounds Working Pressure.



Fig. 650.
Globe Pattern.



Fig. 749.
Cross Pattern.



Fig. 918.
Angle Pattern.

These valves are guaranteed to stand a working pressure of 250 pounds. See pages 140 and 141 for a description of screw down check Valves.

Tongued and grooved or male and female body and companion flanges can be had if desired. The above made of Semi-Steel, a material having a tensile strength of over 30,000 pounds, will be furnished when so ordered. Prices on application.

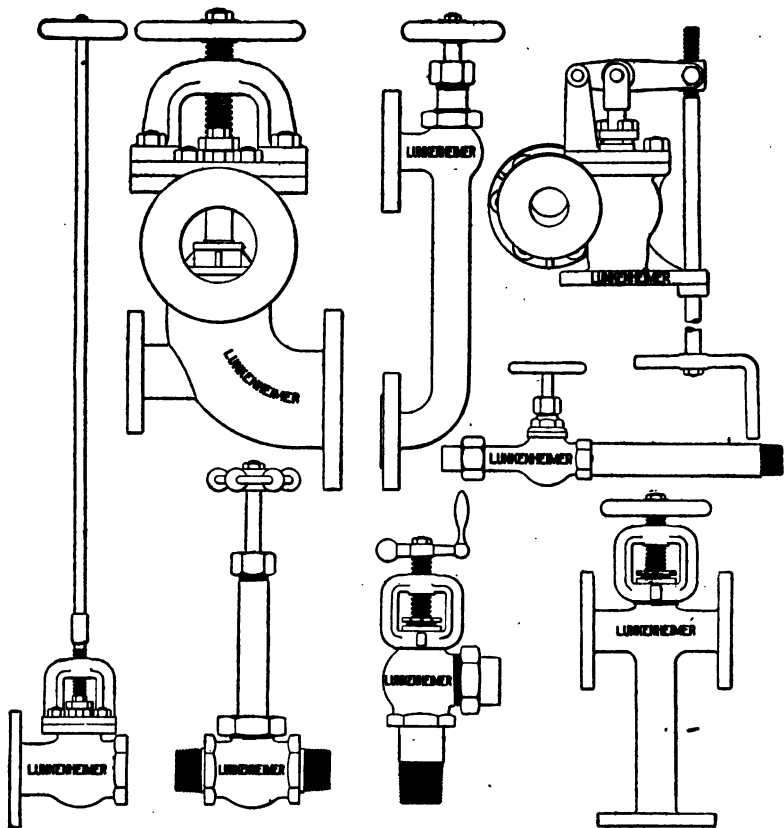
PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
Extra Heavy Globe Pattern, Flange Ends, each	39 00	44 00	50 00	56 00	63 00	71 00	81 00	100 00	125 00	150 00	250 00	375 00
Extra Heavy Angle Pattern, Flange Ends, each	39 00	44 00	50 00	56 00	63 00	71 00	81 00	100 00	125 00	150 00	250 00	375 00
Extra Heavy Cross Pattern, Flange Ends, each	48 00	54 00	63 00	69 00	75 00	83 00	100 00	125 00	155 00	190 00	310 00	470 00

For general dimensions see list on page 405.

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER
VALVES OF SPECIAL DESIGN.



We illustrate above a few of the many special forms of valves which we are from time to time called upon to furnish. Owing to our improved facilities, and by the aid of skilled mechanics, we are better prepared for work of this kind than any other manufacturer.

We make a feature of special work for Engine and Machine Builders, and will be pleased to furnish estimates on receipt of specifications, drawings, etc.

All of our goods are guaranteed, and should they in any way prove defective we will replace them free of charge. This guarantee is not made by any other manufacturer of similar goods, and consequently the advantages and benefits of installing reliable and durable articles will be fully appreciated.

Be sure to see that the name LUNKENHEIMER is on every Engineering Appliance, otherwise the same is not genuine.

SECTION II.

SAFETY VALVES.

LUNKENHEIMER POP SAFETY VALVES.

A consideration of the various fittings and appliances connected with the operation of steam boilers makes plain the fact that the Safety Valve, owing to its functions, is necessarily the most important.

When we allude to Safety Valves, we mean those of the most approved pattern, or what is commonly called the Pop Valve, which, owing to its manifold advantages and merits, is fast replacing those of the common lever and ball pattern.

In its operation, a Pop Safety Valve must be so constructed as to be sensitive to any excess of pressure beyond the point at which it is set, and in discharging it must be designed so as to give instant and positive relief to the boiler to which it is attached.

Further than this, its construction must also combine durability, so as to maintain the integrity of its action and insure its performance under the most exacting conditions.

To this end, we have designed a line of valves which we illustrate and describe in detail on the following pages, and which for upwards of twenty years have been in use under all conditions of service. Their many merits and advantages of construction have earned for them a reputation for superiority and excellence not enjoyed by any other makes of similar articles.

Lunkenheimer Pop Safety Valves are heavy, made of the very best of materials, well finished in every way, and have but one large spring, which is made of the best steel procurable, carefully wound and tempered. It is suspended between ball and socket plates, the pressure thereby being equally divided on the disc and there is no danger of the spring getting out of line. Our Iron Body Valves can also be had made of semi-steel, a material that has a tensile strength of nearly 40,000 pounds per square inch. The working parts of our valves can be removed from valve body without breaking pipe connections.

The valves are simple in construction, thus making it impossible for them to get out of order, and we warrant them to be reliable, accurate and of the very highest quality. They have full relieving capacity, are very sensitive, and admit of being finely adjusted.

All valves are provided with a lock-key attachment to guard against their being tampered with, and adjustments of pop lip and pressure can be made from the outside of valve without taking same apart.

Lunkenheimer Pop Safety Valves—Continued.

Lunkenheimer Pop Safety Valves have been approved by the United States Board of Supervising Inspectors of Steam Vessels, and their use allowed on boilers in Marine Service. They conform in every way to Section 28, Rule 2 of the General Rules and Regulations, as prescribed by that Board.

They have bevel seats at an angle of 49 degrees to the vertical axis of the valve, are provided with suitable levers by means of which the discs can be raised from their seats whenever desired. Our valves are allowed for use at the very highest rating, i. e., that of one square inch of valve area to every three square feet of grate surface of boilers.

All valves are carefully tested under live steam pressure and a variety of other conditions, and we guarantee them in every way. Full directions for attaching and operating are sent with each valve.

All parts of the valves are renewable, and any worn or broken piece can readily be replaced.

The simplest and most reliable way to ascertain the size of valve required is to find the number of square feet of grate surface of boiler, divide this amount by three, and the quotient will be the number of square inches of valve area necessary. Reference to table of areas in the back part of this catalogue will at once show the size of valve required.

To insure proper working, pop valves should be attached directly upon the boiler, or as close to same as possible, otherwise the connecting pipe should be at least one size larger in diameter than the valve. Avoid the use of elbows between the valve and boiler.

When ordering, state plainly the size of valve required, pressure at which it is to be set to blow off, and whether wanted with flange, screw, or screw and flange ends. When not otherwise specified, all orders for brass valves will be filled with top outlet valves, screw end, and for iron body valves with flange inlet and screw outlet set at 100 pounds.

Be sure the name LUNKENHEIMER is on every valve, otherwise the same is not genuine.

LUNKENHEIMER

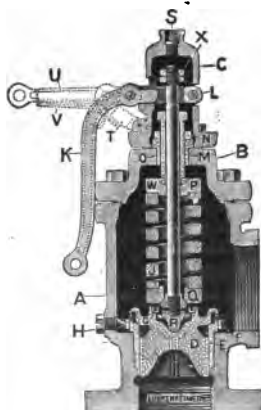
PLAIN PATTERN POP SAFETY VALVES.

Iron Body Brass Mounted.

Screw, Flange or Flange and Screw Ends.



Fig. 750.
Screw Ends.



Sectional View.



Fig. 751.
Flange and Screw Ends.

To meet the demand for a lower priced pop safety valve than our Improved Pattern with Encased Spring, illustrated and described on pages 162 and 164, we have placed upon the market the valves shown herewith. While not possessing all of the advantages of construction of our Improved Pattern, nevertheless they are very reliable in operation.

These valves have large, carefully wound and tempered springs (made of the best steel procurable) which rests between ball and socket plates at top and bottom, thereby insuring an even pressure on the disc.

The pop lip can be adjusted, also the pressure regulating nut, without taking the valve apart. See page 163 for directions to set and regulate.

Plain Pattern Pop Safety Valves.—Continued.

The seat and disc are made of the best bronze composition, but where required, we can furnish these valves with nickel seats.

All valves have lock attachment, to prevent the pressure setting from being tampered with. Full directions for attaching and operating are sent with each valve.

To take the valve apart, take off the lever, then the bonnet, and remove the load on the spring by unscrewing the regulating screw, after which the top can be removed, when access to the interior of the valve can readily be had.

When ordering, state plainly the size of the valve required, pressure at which it is to be set to blow off, whether wanted with screw, flange or flange and screw ends, and with straight or side lever. When not otherwise specified, all orders will be filled with iron body valves with bronze mountings, flange and screw ends, side lever and set at 100 pounds.

For a general description see page 158 and 159, where a simple method of ascertaining the size of pop valve required is also given. These valves can be made of Semi-Steel, a material which has a tensile strength of over 30,000 pounds.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6
Screw Ends,.....each	22 00	32 00	40 00	56 00	72 00	84 00	140 00	175 00
Flange and Screw Ends,.....each	22 00	32 00	40 00	56 00	72 00	84 00	140 00	175 00
Suitable for Boilers,.....H. P.	50	70	100	125	150	175	200	300

For general dimensions see page 431.

All genuine valves have the name LUNKENHEIMER cast on the body.

THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

LUNKENHEIMER
TWIN POP SAFETY VALVES.
Iron Body Brass Mounted.



Fig. 752.

Where it is desired to attach two independently operated pop safety valves to a boiler having a single connection therefor we are prepared to furnish our Twin Pop Safety Valves as shown above. They consist of two of our Improved Pattern Pop Safety Valves, as illustrated and described in full on pages 162 and 163, attached to a Y base. They can also be furnished with Plain Pattern Pop Valves if desired.

It is usual to set one valve about five pounds higher than the other, so that both will not pop at the same time, as either valve should be of a size sufficiently large to properly relieve the boiler.

These valves can also be made entirely of bronze with flange outlets, and nickel seats can also be furnished when so ordered, or they can be made of Semi-Steel, a material having a tensile strength of over 30,000 pounds.

When ordering be sure to state at what pressure it is desired the valves should be set to blow off, whether wanted with screw or flange outlets, straight or side levers, and whether Iron Body Brass Mounted or all Bronze is desired.

For a more compact arrangement, we can furnish our Duplex Pop Safety Valve, shown on page 167.

For dimensions of our Improved Pattern Pop Safety Valve, see page 431. Dimensions of Y base of our Twin Pop Safety Valve will be furnished on application.

PRICE LIST.

Size, .....inches	Outlet Inlet	2 x 2	2½ x 2½	3 x 3	3 x 3	3½ x 3½	4 x 4
		3	3½	4	4½	5	6
Iron Body Brass Mounted, Twin Pop Safety Valves, each		62 00	86 00	108 00	112 00	148 00	197 00
Diameter of bottom flange on Y base,.....inches		8½	9	10	10½	11	12½
Diameter of flanges top of Y-base,.....inches		6½	7½	8½	8½	9	10
Suitable for Boilers, H. P.,.....		50	70	100	100	125	150

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
"DUPLIX" POP SAFETY VALVES.

Side or End Outlets.
Iron Body Brass Mounted.



Fig. 653.
Side Outlet.



Fig. 753.
End Outlet.

The illustrations above show a very desirable form of safety valve, in which two independently operated valves are combined in one casing. This construction is intended to meet the requirements of places where it is necessary that two safety valves shall be attached to a boiler. The construction of the valves proper is the same as our Improved Pattern Pop Safety Valve shown on pages 162 and 163. They are complete in every particular, heavily and substantially constructed, carefully tested, and are guaranteed to be entirely reliable.

We are prepared to supply these valves either iron body with bronze mountings or all bronze, the latter form being required for marine purposes. They can also be had made of Semi-Steel, a material having a tensile strength of over 30,000 pounds.

We have supplied many of these for ocean-going vessels, and the bronze valves are extensively used in the United States and foreign navies. Valves with nickel seats can also be had when so ordered.

It is customary to set one valve about five pounds higher than the other, and in estimating the size of the above either valve is considered capable of relieving the boiler. The only object in having two valves is to provide against one becoming inoperative.

We can supply the valves with a lever mechanism so arranged that both valves can be operated by means of a single lever, in such a manner, however, that the valves are lifted from their seats successively and not simultaneously.

Dimensions and prices will cheerfully be furnished on application.

LUNKENHEIMER **MARINE PATTERN POP SAFETY VALVES.**

Screw, Flange or Flange and Screw Ends.

Iron Body Brass Mounted.



Fig. 782.

Flange and Screw Ends.

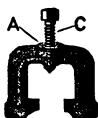


Fig. 781.

Flange Ends.

Our Marine Pattern Pop Safety Valves have no equal as regards durability, efficiency and capacity of relief. The valves are provided with bevel seats at an angle of 45 degrees and are provided with a cam-lifting lever for raising the disc off its seat for blowing off the steam when desired, as required by the rules and regulations of the United States Board of Supervisors and Inspectors of Steam Vessels. Handles are provided on top of stems which enables the disc being turned on its seat to remove incrustations that might have accumulated.

The springs are large and are made of the best steel procurable. They are protected from the escaping steam and owing to the improved construction of the valve, there is absolutely no danger of back pressure.

By means of the testing clamp shown above, the disc is firmly held to its seat when it is desired to test the boiler.

These valves can be had made entirely of bronze if so desired. Prices on application. Clearly state when ordering whether valves are wanted with screw, flange or flange and screw ends and also at what pressures they are to be set to blow off.

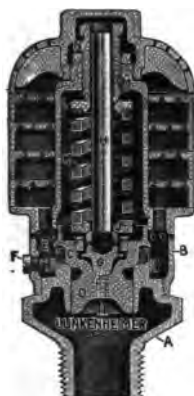
In general, the description on pages 162 and 163 applies to the above.

PRICE LIST.

Size, inches	2	2½	3	3½	4	4½	5	6
Screw Ends, each	26 50	38 00	48 00	67 00	86 00	100 00	170 00	210 00
Flange Ends, each	26 50	38 00	48 00	67 00	86 00	100 00	170 00	210 00
Suitable for Boilers, H. P.	50	70	100	125	150	175	200	300

All genuine valves have the name LUNKENHEIMER cast on same.

LUNKENHEIMER
TOP OUTLET POP SAFETY VALVES
WITH MUFFLER.
BRASS.



Sectional View.

Fig. 825.



Exterior.

To subdue the objectionable noise of escaping steam without, however, affecting the free discharge of steam, or the full relieving capacity of the valve, we are prepared to furnish the above.

The muffer consists of a series of perforated plates held in position by a flange on the bonnet, and by taking off the bonnet the plates can readily be removed.

The above arrangement of combining the pop valve and muffer form a very neat and compact arrangement, and while the illustration above shows the valve with male screw end same can be had with female screw or flange inlet, as desired.

When ordering be sure to specify pressure valves are wanted set to blow off. Unless otherwise ordered, they will be set for 100 pounds.

The principal features of the valve proper are fully described on pages 160 and 161.

PRICE LIST.

Size, .....inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Pop Safety Valve with Muffer,.....each	14 50	17 50	23 00	25 50	34 00
Suitable for Boilers H. P.,.....each	8 to 10	12 to 15	18	20 to 25	30

All genuine valves have the name LUNKENHEIMER cast on same.

LUNKENHEIMER MIDGET POP SAFETY VALVES.

BRASS.



Fig. 379.

The above was designed for use on steam automobiles, small stationary boilers, gas tanks and the like, where a small but substantial, durable and positive operating Pop Safety Valve is desired.

They are very neat in appearance, are made of the very highest grade of bronze composition, and are so proportioned that they will readily admit of free and unobstructed discharge.

The valve is furnished with snap lever arrangement, by which means the pressure of the spring on the disc can at any time be removed, thereby releasing the pressure in the tank, etc. When the lever is placed in a horizontal position, the valve is again made operative. The setting of the valve is not in the least affected by the manipulation of the lever.

When ordering, be sure to specify at what pressure the valve is to be set to blow off.

PRICE LIST.

Size.....inches	$\frac{3}{8}$	$\frac{1}{2}$
Brass, Angle Outlet.....each	6 00	7 00

All genuine valves have the name LUNKENHEIMER on same.

LUNKENHEIMER
POP VALVE MUFFLERS.

Screw or Flange End.

Iron Body Brass Mounted



Fig. 795.
Male and Female Screw Ends.



Fig. 796.
Male Screw Inlet and Flange Outlet.

Lunkenheim Pop Valve Mufflers are very simple, compact and strong. Owing to their practical design they will effectually muffle the objectionable noise of escaping steam, but at the same time they offer no resistance to the free escape of same.

By simply removing the cap ready access can be had to the bronze muffler plates. The Muffler is constructed with male threaded inlet, made of brass, which is screwed into the outlet of a pop valve, thereby making the connection very simple.

When ordering be sure to specify whether the outlet is to be screw or flange. Unless otherwise specified they will be furnished with screw end. The sizes given below designate the size of "Pop" Safety Valve for which they are intended, but have one size larger connections. For instance, the 2-inch "Pop" Valve has a 2-inch inlet but 2½-inch outlet, and as the muffler is screwed into the outlet, hence a 2-inch muffler has 2½-inch connections.

PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6
Male and Female Muffler,.....each	16 50	21 00	28 00	39 00	45 00	53 00	64 00	77 00
Flanged Outlet, Male Threaded Inlet,.....each	17 50	23 50	30 50	41 00	48 00	56 00	68 00	83 00

All genuine Mufflers have the name LUNKENHEIMER cast on same.

LUNKENHEIMER IMPROVED PATTERN RELIEF VALVES.

For Engine Cylinders.

BRASS.



Fig. 656.
Top Outlet.
Male Inlet.



Fig. 287.
Top Outlet.
Female Inlet.



Fig. 658.
Angle Outlet.
Male Inlet.



Fig. 286.
Angle Outlet.
Female Inlet.

These valves were designed for use on engine cylinders and will relieve instantly any dangerous accumulations of water in same.

Engine Cylinders provided with Lunkenheimer Relief Valves are protected from such disasters as the blowing out of cylinder heads, etc.

Our valves are well made in every respect, are strong, durable and positive in operation and the relief is free and unobstructed. They are handsomely finished, and if desired, can be had nickel plated.

It is the usual practice to set the valves to relieve at from 10 to 15 pounds higher than the working pressure, and when ordering be sure to specify at what pressure the valves are to be set to blow off, also whether wanted with male or female inlet.

PRICE LIST.

Size, inches	½	¾	1	1¼	1½	2	2½	3
Top Outlet, Male Inlet, Fig. 656, or Female Inlet Fig. 287, Finished Brass,.....each	3 70	4 20	4 70	5 50	7 00	11 00	17 00	23 50
Angle Outlet, Male Inlet, Fig. 658, or Female Inlet, Fig. 286, Finished Brass,.....each	4 20	4 40	5 00	6 00	7 60	12 00	18 50	25 00
Top Outlet, Male Inlet, Fig. 656, or Female Inlet, Fig. 287, Nickel Plated,.....each	4 40	5 00	5 70	6 80	8 50	13 00	19 50	27 00
Angle Outlet, Male Inlet, Fig. 658, or Female Inlet, Fig. 286, Nickel Plated,.....each	4 90	5 20	6 00	7 30	9 00	14 00	21 00	28 50
Top Outlet, with Flange Inlet, Fig. 241, Finished Brass,.....each	4 60	5 20	6 40	7 40	10 20	15 60	23 50	31 00
Angle Outlet, Flanged Inlet, Screw Outlet, Fig. 240, Finished Brass,.....each	4 90	5 50	6 70	8 30	11 00	22 50	25 00	33 00
Angle Outlet, Flange Both Inlet and Outlet, Finished Brass, Fig. 239,.....each	6 40	7 30	9 20	11 50	15 60	29 50	34 00	44 00

All genuine valves have the name LUNKENHEIMER on the body.

For general dimensions see page 430.

LUNKENHEIMER
SIDE OUTLET IMPROVED PATTERN WATER
RELIEF VALVES.

With Regulating Wheels.

Screw or Flange and Screw Ends.

BRASS.



Fig. 791.



Fig. 288.



Fig. 792.

Screw Ends. Male Inlet. Screw Ends. Female Inlet. Flange and Screw Ends.

The above are similar to those on opposite page with the exception that these valves are provided with regulating handwheels, by means of which they can conveniently be made to relieve at any desired pressure. They are extensively used on steam cylinders, pumps, fire engines, etc., and wherever a substantial, durable and positive operating valve is wanted.

Cylinder relief valves are usually set from 10 to 15 pounds higher than the working pressure on the engine, and when ordering be sure to specify at what pressure the valves should be set to blow off and also whether wanted with screw ends or flange at bottom and screw at side. Unless otherwise specified, they will be furnished with male screw end on bottom and female screw on outlet.

PRICE LIST.

Size, inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Finished Brass with Male Inlet,.....each	4 00	4 90	5 50	6 60	8 40	13 50	20 50	27 50
Finished Brass with Female Inlet,.....each	4 60	4 90	5 50	6 60	8 40	13 50	20 50	27 50
Finished Brass with Flanged Inlet,.....each	5 40	6 10	7 50	9 20	12 00	25 00	27 50	36 00
Nickel Plated with Male Inlet,.....each	5 30	5 70	6 50	7 90	9 80	15 50	23 00	31 00
Nickel Plated with Female Inlet,.....each	5 30	5 70	6 50	7 90	9 80	15 50	23 00	31 00

All genuine valves have the name LUNKENHEIMER cast on the body.

For general dimensions see page 430.

LUNKENHEIMER
PLAIN PATTERN RELIEF VALVES,
With and Without Regulating Wheel.
BRASS.



Fig. 202.
Without Regulating Wheel.



Fig. 382.
With Regulating Wheel.

For a low-price, though durable and reliable relief valve, we offer to the trade the valves illustrated above. They can readily be set to blow off at any desired pressure, by regulating the set screw on top of the valve without hand wheel, or by means of the hand wheel on those supplied with same.

The valves have full relieving capacity, are simple in construction and are guaranteed in every respect.

When ordering be sure to specify at what pressure it is desired the valves should be set to blow off, also whether wanted with male or female inlet.

PRICE LIST.

Size,.....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	2
Plain Pattern Relief Valve, Female Inlet, Fig. 383,.....each	2 60	2 80	3 20	3 90	4 70	5 20
Plain Pattern Relief Valve, Male Inlet, Fig. 202,.....each	2 60	2 80	3 20	3 90	4 70	5 20
Plain Pattern Water Relief Valve, Female Inlet, Fig. 201,.....each	3 00	3 50	4 00	4 80	5 60	6 70
Plain Pattern Water Relief Valve, Male Inlet, Fig. 382,.....each	3 00	3 50	4 00	4 80	5 60	6 70

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
UNDERWRITERS PATTERN WATER RELIEF
VALVES.

Iron Body Brass Mounted.

Screw or Flange and Screw Ends.



Fig. 793.
Screw Ends.



Fig. 794.
Flange and Screw Ends.

The above are strong, durable, practical and perfectly reliable. They are provided with hand wheel by which means the valve can be regulated to decrease or increase the opening pressure.

These valves are constructed in accordance with the latest requirements of the Underwriters and are especially adapted for pumps, hydraulic elevators, water works, etc.

In ordering always state whether wanted with screw or flange bottom and also at what pressure it is desired the valve should be set to blow off.

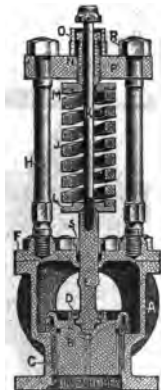
PRICE LIST.

Size, .....inches	2	2½	3	3½	4	4½	5	6
Screw Ends, .....each	22 00	32 00	40 00	56 00	72 00	84 00	140 00	175 00
Flange and Screw Ends,.....each	22 00	32 00	40 00	56 00	72 00	84 00	140 00	175 00

All genuine valves have the name LUNKENHEIMER cast on same.

LUNKENHEIMER OUTSIDE SPRING RELIEF VALVES.

Iron Body Brass Mounted or all Brass.



Sectional View.

Fig. 386.



Flange Ends.
Exterior.

The Lunkenheim Relief Valve with Outside Spring is a very desirable form of valve and quite a number of them (made entirely of bronze) have been furnished for the Navy.

The sectional view above shows the interior of the valve, from which it will readily be seen that it is all that can be desired as regards construction. The valve will positively and promptly relieve when the pressure reaches the point at which it is set, and it will be particularly noticed that the spring and disc operate on a ball and socket seat, which insures free and perfect action of the disc and prevents it from sticking or being wedged when operating.

All of our valves are provided with lock-key attachment, by which means the setting cannot be tampered with, and a loose lever is provided whereby the disc can be raised off its seat whenever desired.

The disc can also be turned on its seat while the pressure is on, whenever it is desired to remove any incrustation that may have accumulated on the seat.

These valves are rigidly tested and inspected before shipment, and we guarantee them in every respect.

They are furnished Iron Body Brass Mounted, unless otherwise specified, though same can be had made of bronze with steel standards.

When ordering be sure to specify at what pressure valve should be set to blow off; also whether wanted with screw or flange ends.

Prices on application.

The name LUNKENHEIMER is cast on every valve, otherwise the same is genuine.

LUNKENHEIMER

LOCOMOTIVE CYLINDER RELIEF VALVES.

Iron Body Brass Mounted.



Fig. 381.

For Locomotive service, the above has not its equal. It is very strong and durable, and is reliable under the most severe service. The construction is very simple, there are few parts which are large and well made, and hence it is impossible for the valve to get out of order.

They are provided with lock key arrangement, and therefore the setting can not be tampered with.

When ordering be sure to specify what pressure they are to be set at to blow off.

PRICE LIST.

Size,.....inches	2½
Iron Body, Male End,.....each	8 90

All genuine valves have the name LUNKENHEIMER cast on same.

LUNKENHEIMER
ANGLE AND CROSS SAFETY VALVES.

Screw Ends.

BRASS.



Fig. 633. Angle Safety Valve.



Fig. 634. Cross Safety Valve.

These valves were designed for working pressures up to 100 pounds, and are so constructed that they will at all times operate freely and positively. The disc is well guided at both the top and bottom, and will consequently properly seat itself at all times and will not stick.

The valves can also readily be reground when necessary, and any worn out or broken piece can easily be renewed.

Owing to our improved arrangement of attaching the fulcrum to the body the lever and weight can be placed in any desired position.

We can also supply safety valves of this type designed for high pressures, and upon application will send dimensions and prices of same.

PRICE LIST.

Size.....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Angle or Cross Safety Valves.....each	2 50	3 25	3 90	4 70	7 15	9 00	12 50	22 50	33 50
Ball Weights for above.....pounds	3	3	5	8	10	15	20	30	40

All genuine valves have the name LUNKENHEIMER cast in the bodies.

LUNKENHEIMER CROSS SAFETY VALVES.

Iron Body Brass Mounted. Screw or Flange Ends.



Fig. 438. Screw Ends.



Fig. 570. Flange Ends.

The above were designed for 100 pounds working pressure. We are prepared, however, to furnish Iron Body Safety Valves for higher pressures, if desired, and will send prices on application.

The seat and disc are made of bronze, and the latter is accurately guided at both top and bottom, consequently it will seat properly at all times and will not stick.

They are made of the very best materials, and are guaranteed first class in every respect.

PRICE LIST.

Size.....inches	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6
Cross Safety Valves, Screw Ends, each	4 00	5 00	5 80	7 80	13 25	17 25	23 00	28 75	34 50	41 50	57 75
Cross Safety Valves, Flange Ends, each				10 25	16 00	21 50	27 50	34 00	40 00	48 00	65 00
Ball Weights for above.....pounds	8	10	15	20	30	40	50	70	85	100	140

We are also prepared to furnish Angle Safety Valves of this type at same list prices as Cross Pattern.

All genuine valves have LUNKENHEIMER cast on same.

LUNKENHEIMER

POP AND RELIEF VALVE SPRINGS.



Fig. 661.

The efficiency and durability of a pop valve depends largely on the material in the spring, and for use in our valves we manufacture from the highest grade of steel procurable. These springs are wound and tempered separately, and ground true on the ends, and all are put to a series of exacting tests in order to determine their lasting qualities. We do not furnish springs for valves not of our own make.

PRICE LIST.

Size of Valve,.....in.	$\frac{1}{8}$ and $\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
For Pressures up to 75 Pounds, .....each	25	30	30	40	50	75	1 25	2 00	3 00	4 00	4 00	5 00	6 00	6 00
For Pressures 75 to 175 Pounds, .....each	35	40	40	50	65	95	1 60	2 50	3 75	5 00	5 00	6 50	7 50	7 50
For Pressures 175 to 250 Pounds, .....each	50	60	60	80	1 00	1 50	2 50	4 00	6 00	8 00	8 00	9 50	12 00	12 00

SECTION III.

BOILER MOUNTINGS.

LUNKENHEIMER

BLOW-OFF VALVES.

The Blow-Off valves, described and illustrated on the following pages, are of the most approved forms, and will be found to contain a great number of important features not found in any other make of blow-off valve now on the market.

Blow-off valves have probably given more trouble than any other fitting which is a part of the boiler equipment. Many kinds have been offered upon the market which are claimed to possess the chief requisite in valves of this kind, *i. e.*, durability, but in practice they all appear to lack this essential feature. We have made blow-off valves for a great many years, and fully appreciate the difficulties that have been encountered in designing a really satisfactory valve.

The following pages describe and illustrate the several types of blow-off valves manufactured by us, which were designed to meet the various demands both as to service and price. Our valves have given thorough satisfaction wherever installed, and have been in practical use and tested under every condition of service for a great number of years, and their practicability has been established beyond question.

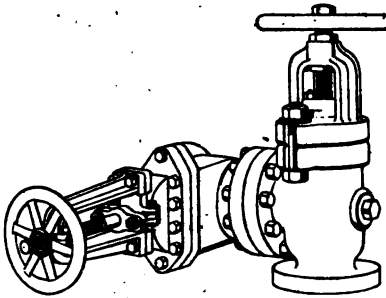
Where a Straight-Way Blow-Off Valve is wanted, we offer the valves described and illustrated on pages 184, 185 and 186. It will be seen by reference to these pages that the valves are made of brass in two weights, for working pressures up to 175 and 300 pounds respectively, and in iron for pressures not exceeding 150 pounds.

The Angle Blow-Off Valves, shown on pages 190 and 191, are made of iron, and supply the demand for a low-priced, substantial and durable valve. They are made very heavy, and are guaranteed to stand a working pressure of 125 pounds. All wearing parts are renewable and, the disc is double-seated.

We describe and illustrate, on pages 187, 188 and 189, our "Duro" Blow-Off Valve, which is unsurpassed by any blow-off valve now on the market. We particularly recommend this valve, as it is the result of a great many years of experience and study, and is now universally acknowledged as a standard. One of the principal features in the construction of this valve is the fact that the seat bearing is self-cleansing. This is highly important, as leaky valves are usually caused by sediment from the boiler lodging on the seat, which prevents the valve from properly seating and oftentimes ruins the disc and seat. The disc is double-faced, and the seat and all other wearing parts of the valve can be renewed when worn.

Our Angle and "Duro" Blow-Off Valves can be had entirely of brass, if so desired. Prices on application.

Lunkenheimer Blow Off Valves—Continued.



A combination that is extensively used is that of the "Duro" Blow-Off Valve with a "Victor" Gate Valve bolted thereto and interposed between it and the boiler. (See cut.) This combination has many advantages not possible by the use of a blow-off valve only. The gate valve can be used as an emergency valve, should accident happen to the blow-off valve, in which event the former can be closed until repairs are made. It not only serves as an emergency valve, but also

insures a perfectly tight blow-off arrangement. The gate valve should be opened and closed but once a day, being closed after the last blow-off and opened early in the morning. It is essential, however, that the gate valve be operated at least once in twenty-four hours, as this will always insure the easy operation of the valve. Upon request, we will be pleased to furnish prices of these combinations.

On pages 192 and 193 will be found a description of our latest improved blow-off valve, which contains the above combination though encased in one body, and which we term our Locomotive Blow-Off Valve, as the same was particularly designed for use on locomotives. This valve is very compact, though it consists of two independently operated valves, one within the other, as clearly shown in the illustration on page 192. The valve is extensively used on locomotive boilers, and is beyond question superior to any blow-off valve or cock ever made for railroad work.

The very best material is used in the construction of our Blow-Off Valves, the iron being hard and close-grained, and only the highest grade of bronze composition is used. The workmanship will be found to be first class in every respect.

Blow-off valves are not genuine unless they have the name LUNKENHEIMER cast on the shell.

**LUNKENHEIMER
REGRINDING STRAIGHTWAY BLOW-OFF VALVE.****Medium Pattern.****For Steam Boilers.****BRASS.****Fig. 543
Male and Female Ends.**

On account of its regrinding feature, this valve will be found to be especially suitable as a blow-off. There are no contracted areas in the passage through the body, and the fact that it is a straight-way valve makes it very desirable in a great number of cases.

The valves are constructed on the same principles as our regrinding valves, described on pages 29 and 31, and are guaranteed to stand a working pressure of 175 pounds. All parts are interchangeable and can be renewed when worn.

Blow-Off Valves are sent with male and female ends, as shown above, unless otherwise specified, and we can furnish both ends female screw when specially ordered.

Up to 2 inches, inclusive, these valves are furnished with hexagon bonnet rings, while the 2½ inch size has a slotted ring, though either hexagon or slotted bonnet rings can be had at the same price, for any size.

PRICE LIST.

Size, .....inches	¾	1	1¼	1½	2	2½
Female Ends, Fig. 227, or Male and Female Ends, Fig. 543, .....each	2 75	3 25	4 00	5 75	9 00	18 50
Both Ends Flanged, Fig. 267, .....each	.....	7 00	8 70	11 50	19 00	29 00

All genuine valves have the name LUNKENHEIMER cast in the body.

For general dimensions see page 432.

LUNKENHEIMER
REGRINDING STRAIGHTWAY BLOW-OFF VALVE.

Extra Heavy Pattern.

For Steam Boilers.

BRASS.

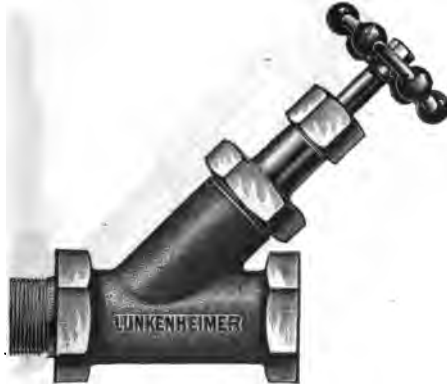


Fig. 921.
Male and Female Ends.

With the exception that the above is our Extra Heavy Pattern and is suitable for 300 pounds working pressure, it is the same as the blow-off valve shown on page 184.

The valves are furnished with male and female ends, as illustrated above, unless otherwise specified. They can be had, however, with both ends female thread, flange or screw and flange ends. Up to and including the 2 inch size, the valves are fitted with hexagon bonnet rings, while the 2½ inch size has a slotted ring, unless otherwise ordered, though either hexagon or slotted rings can be had for any size at the same price.

PRICE LIST.

Size, inches	¾	1	1¼	1½	2	2½
Female Ends (Fig. 226), or Male and Female Ends (Fig. 921), ea.	4 00	4 90	6 00	8 60	13 50	28 00
Both Ends Flanged, Fig. 266.....each	.....	10 50	13 00	17 50	28 50	43 50

*All genuine valves have the name LUNKENHEIMER cast on the body.
For general dimensions see list on page 433.*

**LUNKENHEIMER
STRAIGHTWAY BLOW-OFF VALVES.****Medium and Heavy Patterns.****For Steam Boilers.****Iron Body Brass Mounted.****Fig. 935. Female Screw Ends.**

The same principles of construction have been followed in the design of the above as in our brass valves, described on pages 184 and 185.

Our Iron Body Valves are very durable, and are made in Medium and Heavy Patterns, guaranteed for 125 and 150 pounds per square inch, respectively. All of the wearing parts are of bronze, and can be replaced when worn.

These valves can be had with either screw or flange ends, though screw ends will be sent unless otherwise specified.

PRICE LIST.

Size, .....inches	2	2½	3
Female Both Ends, Fig. 935, .....each	8 50	12 00	16 50
Medium Pattern, Flanged both Ends, Fig. 305, .....each	12 00	18 00	25 00
Heavy Pattern, Flanged both Ends, Fig. 304, .....each	18 00	25 00	34 00

*All genuine valves have the name LUNKENHEIMER cast on the valve body.
See page 434 for general dimensions.*

LUNKENHEIMER

"DURO" BLOW-OFF VALVES.

With Self-Cleansing Seat.



Fig. 896.
Screw Ends.



Fig. 897.
Flange Ends.

Lunkenheim "Duro" Blow-off Valves have now been in use for a number of years, during which time we have received none but highly creditable and gratifying reports regarding their adaptability to the particular use for which they were designed.

The object in the design of this valve was to include whatever merits our old style valve (described on pages 190 and 191) possessed, and, in addition, a number of improvements, which will at once impress users with their practicality.

Heretofore, in all makes of Blow-off Valves, the seat was so located that as the disc approached same there would be an accumulation of scale and sediment. The effect of this accumulation would be to cut out the bearing surfaces to such an extent that in a short time the valve would become leaky. Various methods have been invented whereby the disc would fit tightly in the valve body, the object being to prevent the scale from passing on to the seat bearing after the disc had passed and cut off the inlet. This method, however, has not proven satisfactory, as the valve body would soon wear, and in a short time permit the passage of scale and sediment. In the "Duro" valve, these defects have been overcome. The plug fits snugly in a separate and easily removable bronze casting, which can readily be replaced when worn. Any accumulation of scale that might remain on the seat before the disc is brought in contact with same, is washed off by the water which passes around the plug when seating.

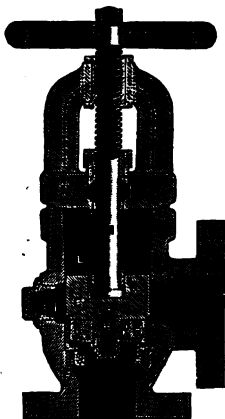
"Duro" Blow-Off Valves.—Continued.

In the sectional view it will be seen that the plug C carries a reversible double-faced disc D, secured to plug C by stud H and nut J. This plug C is guided perfectly in the valve body A. The bronze seat ring E is screwed into a second brass ring F, the object of this being to make it possible to renew E very easily in case same is worn. At the back of the valve is a plug B, the use of which is to permit the introduction of a rod to clean out the blow-off pipe when desired. The stem M, which raises and lowers the disc C, is held in place by lock-nut L, which is prevented from unscrewing by non-rotating washer K. It operates in the bronze bushing located in the top of the yoke, which bushing can easily be renewed when worn, and there is no danger to be apprehended from corrosion of stem and yoke. It will be seen from this description that all parts of the valve have been so designed that they can be easily renewed when worn or broken. The disc D, having two Babbitt-faced bearings G G, can be replaced at small cost, or the user of the valve can melt out the old Babbitt and pour in new metal, and after this is faced off, the disc is as good as new.

In operating the "Duro" Valve, when it is desired to close same, the disc is screwed down in the usual manner. As the edge of the disc D approaches the cylindrical extension of E, these edges shear and cut off any scale or sediment which might pass. As the disc D continues to approach the seat bearing E, it is well to operate the valve slowly, as this gives the leakage of water around the disc a better opportunity to effectually wash off any scale or sediment which might have accumulated thereon.

The result of this is that when the disc is perfectly seated no scale or sediment can remain between the bearings. In all other makes of blow-off valves there is no provision made for washing off the seat bearing or renewing the part E, which in time will be worn by the shearing of the disc D when cutting off scale and sediment. As both of these parts can be renewed very easily and at a small cost, it will be plain that the valve is very durable and will last indefinitely. These parts can be supplied promptly and at small cost.

All parts about the valve are heavily and substantially constructed, and all things considered, we feel satisfied that it is the best and most substantial Blow-off Valve ever placed on the market.

**Sectional View.**

"Duro" Blow-Off Valves.—Continued.

It has been in practical use and tested under every variety of service for a number of years, and its superiority has been established beyond question. It is constructed of the very best materials and carefully tested, and we guarantee it to surpass any other Blow-off Valve that has been produced up to the present time.

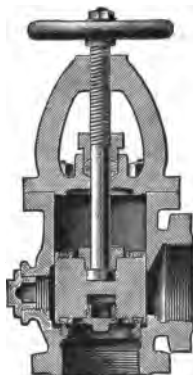
These valves are made in five sizes—1¼, 1½, 2, 2½ and 3 inches, with screw, flange or screw and flange ends. If desired, our "Duro" valves can be made entirely of bronze. Prices on application. When ordering, always state which style is desired, and if wanted with one end screwed and the other flanged, please state which end is to be flanged, whether inlet or outlet. These valves must be connected so that the inlet is at the side.

PRICE LIST.

Size, .....inches	1¼	1½	2	2½	3
Screw Ends, Fig. 896,.....each	7 50	10 00	13 50	18 20	27 50
Screw and Flange Ends, Fig. 312,..... each	8 10	10 80	14 40	19 20	28 60
Flange Ends, Fig. 897,.....each	8 70	11 20	15 00	20 00	30 00

For general dimensions see list on page 435.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
ANGLE BLOW-OFF VALVES.**Iron Body Brass Mounted.****Fig. 615.**
Screw Ends.**Sectional.****Fig. 616.**
Flange Ends.

The Lunkenheim Iron Body Angle Blow-off Valves shown above are of heavy pattern, well made in every particular and guaranteed for working pressures up to 125 pounds. All parts are made of iron excepting the stem, disc-plug, seat ring, lock nut and cleaning plug, which are made of bronze, while the reversible bearing faces in the iron discs are filled with Babbitt metal. These valves supply the demand for a lower-priced blow-off valve than our "Duro," illustrated on pages 187 to 189, and while not possessing all of the advantages of construction of the said "Duro," they are, nevertheless, very reliable.

Reference to the sectional illustration will show that the disc is solid and fits closely in the barrel of the valve shell, so as to prevent scale and sediment from becoming entrapped on top of the disc, which would prevent it from being raised to its limit. The disc is reversible, having two valve or seating faces, thereby increasing the durability and efficiency of the valve considerably. These valve or seating faces in the disc consist of dovetailed slots, which are filled with Babbitt metal, and when both are cut or worn out, the old Babbitt metal can be melted out and new metal poured into the slots and faced off, thus renewing the principal wearing part of the valve, and making the same as efficient as a new one. The brass seat ring in the body of the valve can also be renewed when cut or worn.

Angle Blow-Off Valves.—Continued.

The operation of this valve is similar to our "Duro," inasmuch as when the disc approaches its seat it first comes in contact with a shearing edge in the body directly above the seat, and it will readily be seen that as the disc is about to touch this edge, the water will necessarily rush past the seat in a fine stream, practically free from foreign matter, and any scale or sediment from the boiler that may have accumulated on the seat will be effectually washed away.

To reverse the disc, remove valve bonnet and take entire trimming out of body of valve, then unscrew the small plug at bottom of disc and disc lock-nut around valve stem, and the position of the disc can be reversed so as to present a perfect bearing face to the seat ring in the shell of the valve. The valve is provided with a cleaning plug opposite the inlet end, which can be removed when necessary and a rod inserted to loosen any accumulation of sediment that might gather in the blow-off pipe.

Attention is called to the heavy design of these valves, and we guarantee them to be reliable in every respect. All valves are carefully made of the best materials and are thoroughly tested in every particular; all parts are made to gauges and are interchangeable, so that any broken or worn out piece can be renewed.

They are made in four sizes—1½, 2, 2½ and 3 inches, with screw, flange or screw and flange ends. When ordering, always state which style is desired, and if wanted with one end screwed and other end flanged, please state which end is to be flanged, whether inlet or outlet. These valves should be so connected that the inlet is at the side.

They can also be furnished made entirely of bronze, for Marine purposes. Prices sent upon application.

PRICE LIST.

Size, .....inches	1½	2	2½	3
Screw Ends, Fig. 615,.....each	10 00	13 50	18 20	27 50
Screw and Flange Ends, Fig. 306,.....each	10 80	14 40	19 20	28 60
Flange Ends, Fig. 616,.....each	11 20	15 00	20 00	30 00

For general dimensions see list on page 436.

All genuine valves have the name LUNKENHEIMER cast on the body.

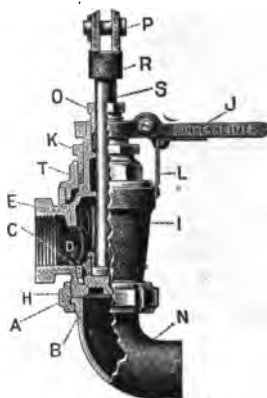
LUNKENHEIMER

LOCOMOTIVE BLOW-OFF VALVES.

BRASS.



Fig. 399.



Sectional.

The Lunkenheimer Locomotive Blow-Off Valve—made by us under patents granted to Frederick Mertsheimer, late Superintendent of the Denver & Rio Grande Railroad, and now Superintendent M. P. of C., H. & D. & P. M. Railway System—is designed to take the place of those heretofore commonly used in locomotive service, but which have not fulfilled the necessary requirements. This valve is operated by hand, and is so constructed as to eliminate all tendencies to fouling, sticking or leaking, being at the same time perfectly positive in every action.

The valve is adapted not alone to locomotives, but can also be used to equally great advantage on stationary boilers, where a reliable valve with the emergency feature is just as desirable and necessary.

Reference to the sectional illustration will reveal at once the construction of this valve, and its operation is readily understood. The main valve disc and seat are at D and H, the operation of the former being effected by vertical movement of the stem by means of suitable levers attached to the fork P and carried to an accessible point on the running board.

Locomotive Blow-Off Valves—Continued.

The emergency feature, for use in case of possible failure of the main valve, is provided in the "key" or taper plug valve E, made a ground fit in the body I and operated, when required, by the lever handle J. Ordinarily this emergency key remains in open position, as shown, giving free passage through from C to the main valve. Should the latter leak or give trouble in any way, preventing its tight closing, the key may be rotated to close the opening from C.

The lever handle J is held firmly in either open or closed position by the spring L, which engages suitably-placed notches in lugs on the body I.

Immediately above the valve disc D is formed a flange, not only guiding it by the ribs in the key or plug as the valve is raised and lowered, but also providing for positive cleansing of the seat H as the valve is closed. The flange fits snugly within the key, being a few thousandths of an inch smaller in diameter, when, therefore, the lower edge of the flange approaches and passes the edge C of the key opening, there is caused a gradual wire-drawing of the escaping water, more and more of which bursts at once into steam, and by its high velocity becomes quite effective in washing away any sediment which may have collected on or near the seat H.

The main valve seat can be reground should it become worn, which increases its durability, and makes it possible at all times to keep the valve perfectly tight.

Faithful avoidance of contracted areas is a characteristic of this blow-off valve, the passages being at all points fully equal to the connecting pipe. Thus the flow of water is entirely free and quite direct.

Realizing the severe usage to which a blow-off valve must be subjected, unusual care has been exercised in designing this valve and devoting special attention to all details of its construction, and it is extremely heavy throughout. All parts are made to standard gauges and templets, so that any worn or broken parts may be replaced without difficulty.

Connection should be made to the side or throat sheet of the boiler, and the controlling levers so arranged as to be operated conveniently from the running board. We will be pleased to correspond with S. M. P. and M. M. and give further particulars.

PRICE LIST.

Pipe Size,	inches	1½	2
Price,	each	28 00	37 00

All genuine valves have the name LUNKENHEIMER cast on the valve body.

LUNKENHEIMER

"VIGILANT" SAFETY WATER COLUMNS.

Iron Body Brass Mounted.

The "Vigilant" Safety Water Column is all that its name implies. Its extended use and unfailing dependability has proven the fact that it is a safety water column that can be relied upon, and we have demonstrated among steam users everywhere that there is no room for doubt as to its practicability.

When the water in the boiler reaches the high or low danger limit, an alarm is positively and automatically given. We have never had a complaint as to the positive action of the alarm, and this feature is indispensable to the safety of a boiler.

The "Vigilant" not only safeguards the boiler and its attendants, but actual tests have proven that a decided economy in fuel is effected by its use. This is accomplished by carrying the water in the boiler at the lowest constant level consistent with absolute safety, which increases the steam space in the boiler, produces more steam, steadier power, and consequently, decreases the consumption of fuel.

As the column will maintain the water at a steady and proper level, it lengthens the life of the boiler, decreases the amount of repairs and insures uniform steam pressure.

As all columns have the gauge-cock holes tapped on both sides, they can be used as either right or left-hand patterns by transposing plugs and cocks.

If repairs are necessary, the cap B only need be removed, when all the working parts will be exposed and are easily accessible. It is not necessary to take down the entire column or to even remove the water gauge or gauge cocks.

We use but one strong, seamless copper float, which, owing to its form and size, never fails to operate the signal valve upon the approach of the low or high danger limit. The floats are carefully inspected and tested and will not collapse under 350 pounds pressure per square inch.

The sediment chamber H is a very valuable addition to the "Vigilant," inasmuch as it collects the dirt, scale, etc., that would otherwise enter the water gauge and gauge cocks and possibly cause damage. A drain pipe can be screwed into the bottom of the chamber to discharge the collected sediment.

The body and cap are made extra heavy and of close-grained hard iron. The flanges uniting the cap to the body are very thick and the steel bolts used are large in diameter, with nuts seating on finished surfaces. All of the working parts are made of the best bronze composition, and are consequently not affected in the least by corrosion. The various features necessary for a strong, reliable and durable water column have been considered singly, and the "Vigilant" Water Column is thoroughly in keeping with the large line of other Lunkensheimer Specialties.



Section.

Lunkenheimer "Vigilant" Safety Water Column—Continued.

By reference to the sectional cut on preceding page, it will be seen that the float C has rigidly attached thereto the rod D, which operates through a hole in the valve lever E. The stop J, which can be placed in any desired position on the rod D, strikes the valve lever E should the water in the boiler become too high. Referring to the detail cut,—as the valve lever E is raised it lifts the valve L from its seat, allowing the steam to pass through the seat opening and thence to the whistle.

The same result is accomplished when the water becomes too low in the boiler. As the float falls, the knob K on the rod D, forces the valve lever E down, which also opens the valve, allowing steam to reach the whistle.

It will be observed by reference to the detail cut that the valve lever E is not directly connected to the valve L. The valve casing M, by means of the two lugs at the top thereof, is pivotally connected to the lever. Within this casing is fitted the valve L and by this arrangement the valve is caused to travel in an absolutely vertical position, insuring a perfect contact between the valve and its seat.

As will be seen by the table, the Lunkenheimer "Vigilant" is made in various sizes suitable for the different types of boilers. Our No. 6 column has back connections for steam and water, fourteen inches from center to center, and is particularly adapted for the Babcock and Wilcox type of boilers.



Detail of Valve.

Size of Column, .....inches	4	5	6	7	8
Kind and Size of Boiler,	36 to 54	56 to 72	B. & W. Type.	Water Tube.	Vertical.

For general dimensions see list on page 437.

All genuine "Vigilant" Water Columns have the name LUNKENHEIMER cast on them.

LUNKENHEIMER
"VIGILANT" SAFETY WATER COLUMNS.



Fig. 919.

Without Water Gauge or
Gauge Cocks.



Fig. 989.

With Plain Gauge Cocks and Three-
Rod Water Gauge.

A description of our "Vigilant" Safety Water Column is given on pages 194 and 195.

The columns are made in various sizes suitable for the different types of boilers. The No. 6 column has back connections for steam and water and is particularly adapted for the Babcock and Wilcox type of boilers.

Fig. 989 illustrates our "Vigilant" Water Column with Plain Gauge Cocks, described on page 213, and Three Rod Water Gauge illustrated on page 199, attached.

All water gauges furnished with these columns have plugs at top of glass to facilitate removal of same.

PRICE LIST.

Size of Column,.....inches	4	5	6	7	8
Without Water Gauge or Gauge Cocks, Fig. 919, .....each	25 00	28 00	30 00	34 00	40 00
With Plain Gauge Cocks and 3-rod Water Gauge, Fig. 989, ..ea.	32 00	35 00	40 00	44 00	50 00

For general dimensions of "Vigilant" Water Columns see page 437.

All genuine "Vigilant" Columns have the name LUNKENHEIMER cast on them.

LUNKENHEIMER

"VIGILANT" SAFETY WATER COLUMNS.

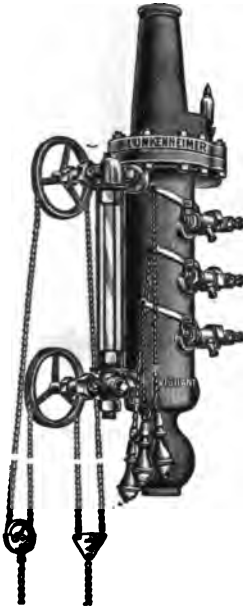


Fig. 990.

"Vigilant" Safety Water Column with
"Excelsior" Gauge Cocks and
"Monitor" Water Gauge.



Fig. 991.

"Vigilant" Water Column with Rotating
Gauge Cocks and Quick Clos-
ing Water Gauge.

For a description of the "Vigilant" Safety Water Column see pages 194 and 195.

Fig. 990 illustrates our "Vigilant" Column with "Excelsior" Gauge Cocks (see pages 208 and 209), and "Monitor" Water Gauge (see pages 202 and 203). We consider this combination far superior to any other on the market, as both the "Monitor" Water Gauge and "Excelsior" Gauge Cocks have a number of advantages which cannot be found in any other goods of their kind.

The combination shown in Fig. 991 consists of our "Vigilant" Column with Rotating Gauge Cocks (see page 212) and Quick Closing Water Gauge (see page 207).

PRICE LIST.

Size,	4	5	6	7	8
"Vigilant" Safety Water Column with "Excelsior" Gauge Cocks and "Monitor" Water Gauge, Fig. 990,	56 00	68 00	70 00	74 00	80 00
"Vigilant" Safety Water Column with Rotating Gauge Cocks and Quick Closing Water Gauge, Fig. 991,	45 00	50 00	55 00	60 00	65 00

For general dimensions of the "Vigilant" Water Column, see page 437.

All genuine "Vigilant" Columns have the name LUNKENHEIMER cast on them

LUNKENHEIMER COMBINATION WATER COLUMNS.



Fig. 461.
Combination Water Column with Steam Gauge.

PRICE LIST.

- No. 1—Combination Iron Column, $2\frac{1}{4}$ inches in diameter, furnished with one 2-Rod, Part Finished Gauge, $\frac{1}{2}$ -inch pipe, $\frac{3}{4} \times 10$ -inch glass, three $\frac{1}{4}$ -inch Soft Seat Compression Gauge Cocks and two $\frac{1}{2}$ -inch Brass Unions for boiler connections (without Steam Gauge),.....each 13 00
- No. 1—Plain Iron Column without trimmings,.....each 3 60
- No. 2—Combination Iron Column, $2\frac{1}{4}$ inches in diameter, furnished with one 3-Rod, Part Finished Gauge, $\frac{1}{2}$ -inch pipe, $\frac{3}{4} \times 10\frac{1}{2}$ -inch glass, three $\frac{1}{4}$ -inch Soft Seat Compression Gauge Cocks and two $\frac{1}{2}$ -inch Brass Unions for boiler connections (without Steam Gauge),.....each 15 00
- No. 2—Plain Iron Column without trimmings,.....each 5 00
- No. 3—Combination Iron Column, $3\frac{1}{2}$ inches in diameter, furnished with one 3-Rod, Part Finished Gauge, $\frac{3}{4}$ -inch pipe, $\frac{3}{4} \times 12$ -inch glass, three $\frac{1}{4}$ -inch Regrinding Gauge Cocks (without Steam Gauge),.....each 19 00
- No. 3—Plain Iron Column without trimmings,.....each 6 00

We also furnish No. 2 tapped at both ends for 1-inch pipe, when specially ordered, without extra charge.

Special columns, made entirely of bronze, can be furnished when required. Prices upon application.

All our water gauges have a plug in top for replacing glass tube.

NOTICE.—Steam gauges and syphons for combination columns are extra.

For general dimensions see list on page 438.

All genuine goods have the name LUNKENHEIMER on them.

LUNKENHEIMER WATER GAUGES.

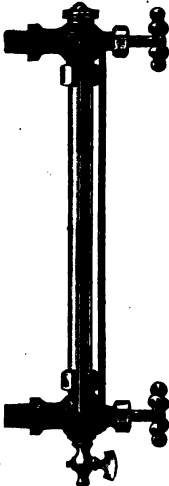


Fig. 459.
Two-Rod.



Fig. 460.
Three-Rod, with Re-
grinding Valves.



Fig. 970.
Four-Rod, with Re-
grinding Valves.

The above are well designed, strong and practical, and are decidedly superior to other makes of plain water gauges on the market.

All parts of the gauges are carefully made, and the valves on the three and four-rod gauges are the same as those of our well-known Regrinding Valve, consequently the seat and disc can easily be reground when worn.

These gauges will readily withstand working pressures up to 175 pounds, for which they are guaranteed.

When ordering always state the distance between centers of connections. Unless otherwise ordered, gauges will be sent with rods and glass for 12-inch centers, though they can be had at the same price up to 18-inch centers, above which an extra charge will be made.

All of our water gauges have a plug in the top for replacing the glass tubes.

PRICE LIST.

TWO-ROD.		
Two-Rod Part Finished, Bronzed Body, $\frac{1}{8}$ Glass, $\frac{3}{8}$ inch Pipe.....	each	2 75
Two-Rod Part Finished, Bronzed Body, $\frac{3}{8}$ Glass, $\frac{1}{2}$ inch Pipe.....	each	3 00
Two-Rod Part Finished, Bronzed Body, $\frac{1}{2}$ Glass, $\frac{3}{4}$ inch Pipe.....	each	6 00
Two-Rod All Finished, $\frac{3}{8}$ Glass, $\frac{3}{8}$ inch Pipe.....	each	3 75
Two-Rod All Finished, $\frac{1}{2}$ Glass, $\frac{1}{2}$ inch Pipe.....	each	8 00
THREE-ROD.		
Three-Rod Part Finished, Bronzed Body, $\frac{1}{8}$ Glass, $\frac{3}{8}$ inch Pipe.....	each	3 50
Three-Rod Part Finished, Bronzed Body, $\frac{3}{8}$ Glass, $\frac{1}{2}$ inch Pipe.....	each	4 00
Three-Rod Part Finished, Bronzed Body, $\frac{1}{2}$ Glass, $\frac{3}{4}$ inch Pipe.....	each	8 00
Three-Rod All Finished, $\frac{3}{8}$ Glass, $\frac{1}{2}$ inch Pipe.....	each	5 00
Three-Rod All Finished, $\frac{1}{2}$ Glass, $\frac{3}{4}$ inch Pipe.....	each	9 50
FOUR-ROD.		
Four-Rod Part Finished, Bronzed Body, $\frac{3}{8}$ Glass, $\frac{1}{2}$ inch Pipe.....	each	5 00
Four-Rod Part Finished, Bronzed Body, $\frac{1}{2}$ Glass, $\frac{3}{4}$ inch Pipe.....	each	8 50
Four-Rod All Finished, $\frac{3}{8}$ Glass, $\frac{1}{2}$ inch Pipe.....	each	6 50
Four-Rod All Finished, $\frac{1}{2}$ Glass, $\frac{3}{4}$ inch Pipe.....	each	10 00

LUNKENHEIMER
AUTOMATIC WATER GAUGES.

Medium Pattern.
With Regrinding Valves.



Fig. 589.
Three Rods.



Sectional View of Upper Gauge.

The Lunkenheimer Automatic Gauge will be found to be all that its name implies, and can be relied upon to act promptly in shutting off water from gauges when the glass breaks, thus the danger and annoyance attendant upon closing of valves attached to gauges is dispensed with.

Reference to the sectional illustration will show the interior construction of the gauge, and its operation will be readily understood. When valves are full open and gauge glass is filled with water, the pressure on both sides of the ball valves is equal, and they will remain off their seats; but if the glass breaks, the sudden rush of water through the gauges will cause the balls to close against their seats, thereby shutting off water and steam.

We call attention to the method of placing the valves, which are offset from the body, which permits the renewal of glasses under full steam pressure. Another feature is the method of making the gauge either right or left-hand, as may be desired. This is done by reversing the plugs at top and bottom of gauges, when the position of same can be changed.

While steam pressure is on, to preserve the automatic feature, the valve stems of both gauges should be screwed back as far as they will go, so as to allow the ball valves to act promptly when occasion requires.

This gauge is made of gun-metal composition, carefully finished, and we can safely recommend it to our patrons as being thoroughly reliable in every way. The valves are of our well-known regrinding type, and can be easily kept tight. All gauges are carefully tested and fully warranted.

When ordering always state the distance between centers of connections. Unless otherwise ordered, gauges are sent with rods and glass for 12-inch centers, though they can be had at the same price up to 18-inch centers, above which an extra charge will be made.

PRICE LIST.

Three-Rod, Part Finished, Iron Wheels, $\frac{3}{4}$ -inch Glass, $\frac{1}{2}$ -inch Pipe Thread,.....each	12 00
Three-Rod, All Finished, Wood Wheels, $\frac{3}{4}$ -inch Glass, $\frac{1}{2}$ -inch Pipe Thread, .....each	14 50
Three-Rod, Part Finished, Iron Wheels, $\frac{3}{4}$ -inch Glass, $\frac{3}{4}$ -inch Pipe Thread,.....each	12 00
Three-Rod, All Finished, Wood Wheels, $\frac{3}{4}$ -inch Glass, $\frac{3}{4}$ -inch Pipe Thread, .....each	14 50

LUNKENHEIMER
AUTOMATIC WATER GAUGES.
Extra Heavy Pattern.
With Regrinding Valves.



Fig. 987.
Three Rods.

For a description of the above, see preceding page. The above is designed for working pressures up to 300 pounds. They are extra heavy throughout, are neat in appearance and the workmanship is perfect.

When ordering always state the distance between centers of connections. Unless otherwise ordered, Gauges are sent with rods and glass for 12 inch centers, though they can be had at the same price up to 18 inch centers, above which an extra charge will be made.

PRICE LIST.

Size,.....inches	$\frac{3}{4}$ Glass $\frac{1}{2}$ Pipe	$\frac{3}{4}$ Glass $\frac{3}{4}$ Pipe
Part Finished, Screw End, Fig. 987 each	19 00	19 00
All Finished, Screw End, Fig. 987 each	20 00	20 00
Part Finished, Flange Inlet, Fig. 988 each	27 00	27 00
All Finished, Flange Inlet, Fig 988 each	28 00	28 00

All genuine Water Gauges have the name LUNKENHEIMER on them.

LUNKENHEIMER

"MONITOR" AUTOMATIC WATER GAUGE.

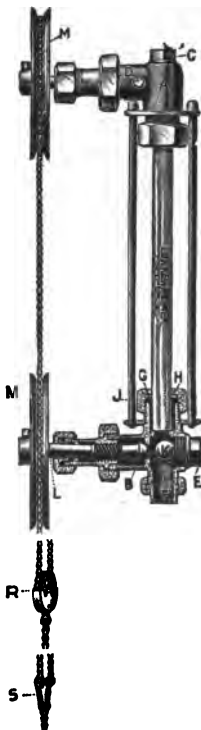
(PATENTED.)

We desire to call particular attention to our new design of Automatic Water Gauge, which we have patented and recently placed on the market. It contains all the good features of our old pattern and in addition thereto a number of new ones which highly recommend its use. Although lately introduced, there are a large number in use throughout the country which are giving thorough satisfaction and are highly appreciated by the users.

It will be noticed that both valves are closed by means of a pulley operating over the chain which connects both valve wheels, the object of this being to insure the perfect seating of both top and bottom valves. The old method of attaching the pulleys, so as to cause them to operate in unison, would not insure the tight seating of both valves, as when one seated before the other, it was almost impossible to close the other. By our improved arrangement, should the one valve seat before the other, it is only necessary to continue pulling on the chain, when, owing to the small pulley which will freely roll on the chain, the other valve will soon become tightly closed. We do not furnish chain with the gauges below the pulley and triangle unless otherwise specified, when an extra charge will be made.

The valves are of our well known regrinding pattern, are quick closing and can be packed under pressure.

The operation of the valve will be readily understood by reference to the sectional illustrations. Should the gauge glass break, the ball valves will be immediately seated by the rush of the escaping steam and water and will prevent further leakage of same. The regrinding valves should then be closed by means of the chains. The packing nuts, together with the top plug, can then be taken off and the broken gauge glass removed and replaced by a new one. After everything is in place, the regrinding valves should then be reopened, when the gauge will again be ready for use.



"Monitor" Automatic Water Gauges—Continued.



Section Through Upper Valve.

There is absolutely no danger of the ball checks seating, unless gauge glass should be broken. In quite a number of cases, serious accidents have occurred owing to a false level shown by the gauge due to the closing of the check balls. The false level occurs in most instances when the drain cock at the bottom is opened which allows the pressure to get below the lower check ball and forces same to its seat. This is not possible with our arrangement, as the passage beneath the ball check will amply permit of the free escape of the water, though should the ball accidentally seat, owing to a sudden rush of water, the same would almost instantly fall away from its seat because of the equalization of pressure above and below the check.

As an alarm for the boiler attendant, we have placed a small groove in the face of the upper valve seat which allows a small quantity of steam to escape when glass breaks and causes a whistling noise. This small quantity of steam not only causes an alarm, but it also prevents the ball checks from remaining seated should they accidentally close, as it will quickly equalize the pressure on either side of the checks.

It will be noticed that a cleaning plug has been placed directly opposite both the steam and water boiler connections. This permits of the insertion of a rod through the tail pieces should it be necessary to clear the same of any collection of sediment. To do this, however, it is necessary that the regrinding valves be wide open and in the steam connection that the check ball be removed.

By means of the cone-shaped rubber packing, an absolutely tight joint is insured around the glass without, however, incurring the least danger of breakage by compression. With this improved packing it is not necessary to use any more force than exerted by one's fingers in order to make the glass tight. These rubber packings will last a long time, and can easily and cheaply be renewed when necessary.

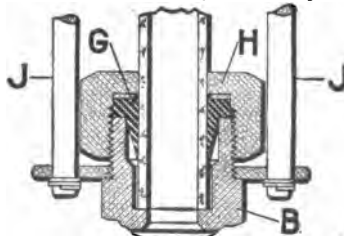
To prevent the glass from scattering about the boiler room when the same breaks and also to prevent the glass from being broken by any external cause, we can furnish a shield which is easily attached around the three rods of the gauge. This shield is not furnished unless specified, and an extra charge will be made for same.

The gauges are furnished with a union at the bottom for a drain connection which facilitates the attachment of a pipe of sufficient length to enable the operator to reach the drain valve placed at the bottom thereof. They can also be had with flanges instead of pipe thread on tail piece of union.

The "Monitor" Automatic gauges are made in two weights which we term our medium and extra heavy patterns and we guarantee them for pressures up to 200 and 300 pounds per square inch respectively.

The Lunkenheimer "Monitor" Automatic Water Gauges are made of the very highest grade of bronze composition, are very neat in appearance and the workmanship is perfect. As all parts are made to gauges and templates, any worn or broken part can be readily renewed. They conform in every way to the requirements of the Lloyds and the British Board of Trade.

When ordering be sure to specify whether wanted with chain attachment below the pulley and triangle, and if so give the length thereof. They are furnished at a special discount from price list. The distance between connections should also be stated. Gauges are sent with rods and glasses for 12 inch centers unless otherwise specified, though same can be had at the same price up to 18 inch centers, above which an extra charge will be made. Also specify whether glass shield is wanted. An extra charge will also be made for this.



Detail View Showing Gauge Glass Rubber Packing.

All genuine gauges have the name LUNKENHEIMER on same.

LUNKENHEIMER "MONITOR" AUTOMATIC WATER GAUGE.

Medium Pattern.

(PATENTED.)



Fig. 920.

See pages 202 and 203
guaranteed for working pres
inch.

When ordering, be sure
tached to the bottom of
give length. They are fur
list below. The distance
Gauges are sent with rods
wise specified, though the
18 inch centers, above which
shields can also be had and prices will be sent on application.

for a complete description. The above is
sures not exceeding 200 pounds per square

to specify whether wanted with chain at
the small pulley and triangle, and if so,
nished at a special discount from the price
between connections should also be stated.
and glass for 12 inch centers unless other-
same can be had at the same price up to
an extra charge will be made. Glass
will be sent on application.

PRICE LIST.

Medium Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{3}{4}$ inch Pipe, Screw End, Fig. 920.....	25 00
Medium Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{1}{2}$ inch Pipe, Screw End, Fig. 920.....	25 00
Medium Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{3}{4}$ inch Flange, $3\frac{1}{2}$ inches Diameter x $\frac{1}{8}$ inch thick, Fig. 215.....	30 00
Medium Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{1}{2}$ inch Flange, 3 inches Diameter x $\frac{1}{8}$ inch thick, Fig. 215.....	30 00

All genuine gauges have the name LUNKENHEIMER on them.

LUNKENHEIMER
"MONITOR" AUTOMATIC WATER GAUGE.
Extra Heavy Pattern.
(PATENTED.)



Fig. 986.

In construction, the above is the same as our Medium Pattern, designed in full on pages 202 and 203. Our Extra Heavy Pattern is designed and guaranteed for a working pressure of 300 pounds. It is neat in design, practical and durable in construction, and we recommend it to our customers.

When ordering, be sure to specify whether wanted with chain attached to the bottom of small length thereof. They are furnished at a special discount from the price list below. The distance between connections should also be stated. Gauges are sent with rods and glass for 12 inch centers unless otherwise specified, though they can be had at the same price up to 18 inch centers, above which an extra charge will be made. Glass shields can also be had and prices will be sent on application.

PRICE LIST.

Extra Heavy Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{1}{2}$ inch Pipe, Screw End, Fig. 986.....	35 00
Extra Heavy Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{1}{2}$ inch Pipe, Screw End, Fig. 986.....	35 00
Extra Heavy Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{1}{2}$ inch Flange, $3\frac{1}{4}$ inches in diameter x $\frac{3}{8}$ inch thick, Fig. 216.....	41 00
Extra Heavy Pattern "Monitor" Automatic Water Gauge, $\frac{3}{4}$ inch Glass, $\frac{1}{2}$ inch Flange, 3 inches in diameter x $\frac{1}{4}$ inch thick, Fig. 216.....	41 00

All genuine gauges have the name LUNKENHEIMER on them.

LUNKENHEIMER

PLAIN PATTERN "MONITOR" WATER GAUGES.



Fig. 378.

The above gauge is constructed and was designed as a class gauge without the self closing feature, the Automatic Gauge described

The valves can be unequaled cleansing the features necessary to

When ordering be sure to specify whether wanted with chain attached to the bottom of the small pulley and triangle, and if so, give the length. When so ordered they are furnished at a special discount from the price list below. The distance between connections should also be stated. Gauges are sent with rods and glass for 12 inch centers unless otherwise specified, though they can be had at the same price up to 18 inch centers, above which an extra charge will be made. Glass shields can also be had, for which prices will be sent on application. The gauges are made either right or left hand, and when ordering be sure to specify which style is desired.

quick closing, very strong and neat in construction to supply the demand for quick closing, high automatic feature. With the exception of this gauge is made exactly like our "Monitor" on pages 202 and 203.

easily reground when worn, the gauge has facilities and the general design embodies all make a practical construction.

PRICE LIST.

Size,.....inches	$\frac{3}{4}$ " Glass, $\frac{1}{2}$ " Pipe	$\frac{3}{4}$ " Glass, $\frac{3}{4}$ " Pipe
Finished Brass,.....each	20 50	21 00

All genuine Gauges have the name LUNKENHEIMER on them.

LUNKENHEIMER
QUICK CLOSING WATER GAUGES.



Fig. 983.

The above are similar to our water gauges illustrated on page 199, with the exception that the stem is provided with a coarse thread, thereby making it quick-closing. Both valves are operated simultaneously, as the cross levers are connected by means of a chain.

These gauges are furnished only with sufficient chain to connect the cross levers, and when ordering be sure to specify whether additional chain is wanted attached to the cross lever. There will be an extra charge for same. The distance between centers of connection should also be given. Gauges are sent with rods and glass for 12-inch centers unless otherwise ordered, though they can be had at the same price up to 18-inch centers, above which an extra charge will be made.

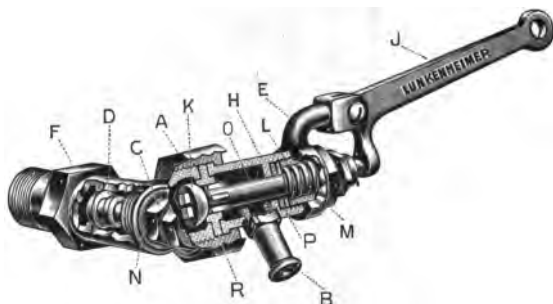
PRICE LIST.

Size, .....inch	$\frac{1}{2}$ in. Glass, $\frac{1}{2}$ in. Pipe.	$\frac{3}{4}$ in. Glass, $\frac{1}{2}$ in. Pipe.	$\frac{3}{4}$ in. Glass, $\frac{3}{4}$ in. Pipe.
Part Finished, Three Rod, .....each	10 50	11 50	13 50
All Finished, Three Rod,.....each	13 00	14 00	16 50

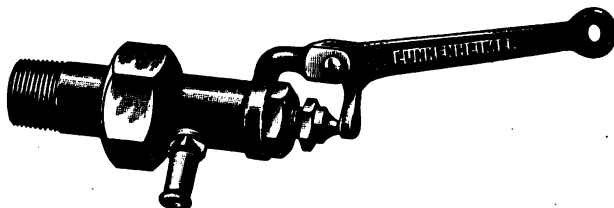
All genuine Gauges have the name LUNKENHEIMER on same.

LUNKENHEIMER

“EXCELSIOR” GAUGE COCKS.



Sectional View of “Excelsior” Gauge Cock with Emergency Valve.



Exterior of Plain Pattern “Excelsior” Gauge Cock.

We have lately placed on the market our “Excelsior” Gauge Cocks which meet in every respect the demand for a substantial, practical and durable device of this kind.

They are made in two styles, viz:—with emergency valve and without, the latter of which we term our Plain Pattern.

Both styles are operated by means of chain attachment which facilitates the operation of the cocks should the water column to which they are attached be placed above the reach of the boiler attendant. The lever J is held to the body by means of the lock nut M and can be turned in any desired position.

By reference to the sectional view above, the numerous advantages of the “Excelsior” will at once be seen and appreciated. The drain nozzle B can be placed in any position desired without danger of leaky joints or stripping threads by turning the body. This is accomplished by means of union connection between shank and body permitting latter to swivel.

"Excelsior" Gauge Cocks—Continued.

To aid in prolonging the life of these Gauge Cocks, we have designed them with a renewable, reversible seat R, by which means a perfectly tight valve can be had at all times. Should one face of the seat become worn it can be readily reversed and the other face used, and when both are worn an entirely new seat can be substituted at small cost.

To prevent the spring and stem from becoming coated with lime and sediment, the opening in the drain nozzle B is made amply large to take care of the discharge through the seat, while the stem is packed by means of the rubber washer P. This construction effectually prevents the escape of steam and water around the stem.

As shown by the exterior view on the opposite page the main valve trimmings of the Plain Pattern "Excelsior" Gauge Cock are the same as those on the cock with emergency valve. The tail piece is first screwed into the boiler or water column and the trimmings connected to it by means of the union ring. By means of the latter the cock can be readily taken apart for cleaning or repairs and put together again; the drain nozzle can be set in any position without disturbing the pipe thread joint.

Besides all these desirable features the device with the emergency valve possesses a most important one in addition, namely, means by which the main valve trimmings can be cleaned, repaired or renewed, while the boiler is under full pressure. The body of the cock is provided with an additional valve D, operated by applying a wrench to the hexagonal nut on the end of the stem, and by closing this valve the cock can be taken apart for the necessary repairs. Ordinarily valve D is screwed back against the plug C, forming a tight joint, and thus dispensing with a stuffing box.

By removing the emergency valve plug C, a rod can be inserted and the shank cleaned should it become clogged with sediment. Thus, the "Excelsior" Gauge Cock with Emergency Valve fulfills all the requirements of the Lloyds and the British Board of Trade. Possessing as it does so many valuable characteristics, it is beyond question the best gauge cock ever devised.

All parts of the cocks are made to gauges and templets and any worn or broken piece can readily be renewed. The material is of the highest grade of bronze composition and the workmanship is beyond criticism.

For price list of "Excelsior" Gauge Cocks, see pages 210 and 211.

All genuine Gauge Cocks have the name LUNKENHEIMER on same.

LUNKENHEIMER

**"EXCELSIOR" GAUGE COCK WITH
EMERGENCY VALVE.**

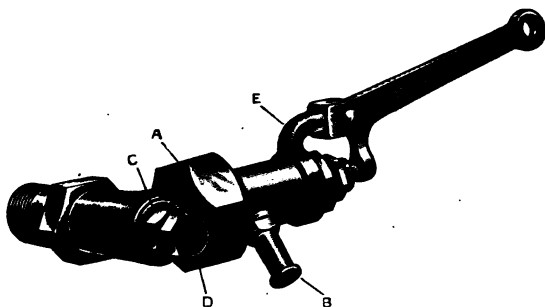


Fig. 992.

For a detailed description see pages 208 and 209.

Unless otherwise ordered, the above are furnished without chain. An extra charge will be made for chain if ordered that way. Be sure to mention length of chain if required.

PRICE LIST.

"Excelsior" Gauge Cock with Emergency Valve, $\frac{1}{2}$ or $\frac{3}{4}$ inch,.....each	6 00
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All genuine Gauge Cocks have the name LUNKENHEIMER on same.

LUNKENHEIMER

"EXCELSIOR" PLAIN PATTERN GAUGE COCK.



Fig. 999.

For a complete description of the above see pages 208 and 209.

When ordering always specify whether wanted with or without chain, and if wanted with, give the length required. They are always furnished without chain unless otherwise ordered and an extra charge is made when ordered with it.

PRICE LIST.

"Excelsior" Gauge Cock without Emergency Valve, $\frac{1}{2}$ or $\frac{3}{4}$ inch,.....each	4 50
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All genuine Gauge Cocks have the name LUNKENHEIMER on same.

LUNKENHEIMER SELF-GRINDING ROTATING GAUGE COCKS.

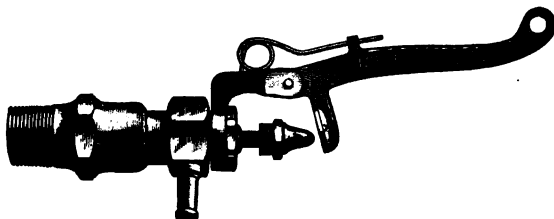


Fig. 555. Short Shank with Lever.

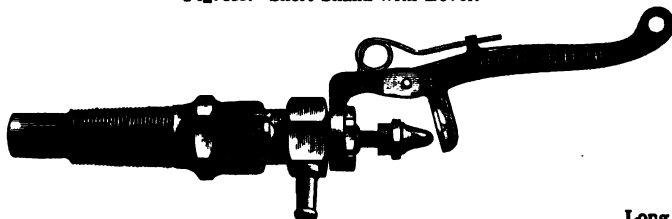


Fig. 665. Long Shank with Lever.

Fig. 664.
Long Shank without
Lever.

The increasing demand for a high class, reliable, self-grinding gauge cock has caused us to place upon the market the Lunkenheimer Self-Grinding Rotating Gauge Cock. This style of gauge cock is preferred by many users to any other, not only on account of its durability, but because it can be used in many places where the other styles of gauge cocks would not be accessible, as in places where the water column is put out of reach, in which case the cock must be operated by a rope or chain attachment. Reference to the illustrations above will show its action. Pressure on button A forces stem E backward and valve B from its seat C and water or steam in passing through the spirals D at a high velocity imparts a rotary motion to the stem E which is pivoted on the fine point of button A against end of lever X. When the pressure on button A is released the boiler pressure forces valve to its seat while the stem is rotating, thus grinding in the seat bearing a little every time the cock is opened. This cock is superior to cocks made with the spirals placed in front of the valve seat, as in such kinds when opened any mud or sediment in the water which passes through the cock is liable to lodge on the spirals, which, being situated where they are subjected to successive intervals of moisture and dryness, causes the foreign substances to become baked and incrustated to them and soon renders the cock inoperative. The lever fulcrum is adjustable and the lever may be kept in a vertical position no matter at what angle the outlet tip may be turned. They are made with or without levers, long or short shanks. The long shank cocks are intended to screw directly into the shell of the boiler, while those with short shanks are suitable for water columns. All cocks are handsomely finished, carefully tested and fully warranted. They can be furnished with blank shanks at a special discount from price list below.

PRICE LIST.

Pipe Thread,	inch	$\frac{1}{2}$	$\frac{3}{4}$
Finished Brass,	each	2 50	2 50

All genuine Gauge Cocks have the name LUNKENHEIMER on them.

LUNKENHEIMER GAUGE COCKS.

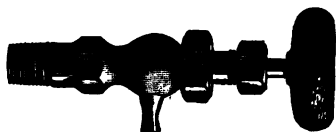


Fig. 466.
Regrinding Gauge Cock.

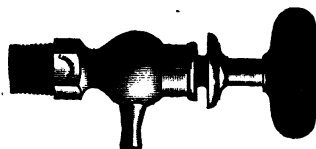


Fig. 467.
Soft Seat Compression Gauge
Cock. Plain.

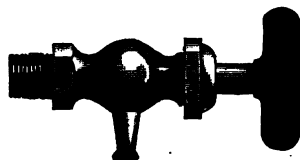


Fig. 577.
Soft Seat Compression
Gauge Cock, with
Stuffing Box.



Fig. 469.
Ball Gauge Cock.



Fig. 468.
Mississippi Gauge Cock.

While we illustrate herewith a variety of gauge cocks, we particularly wish to call attention to our Regrinding pattern, Fig. 466. Engineers having so highly appreciated the advantages of our Regrinding Valves, illustrated on pages 29 to 31, we were induced to place on the market a gauge cock constructed on the same principles. With care and attention to regrinding seat bearing when worn it is almost indestructible. All of our Gauge Cocks are guaranteed first class in every respect.

Gauge Cocks ordered with Blank Shanks are furnished at a special discount from price list below.

PRICE LIST.

Number,.....	00	0	1	2	3	4
Cut for Pipe Thread, .....inch	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Fig. 466. Regrinding Compression Gauge Cock, .....each	90	1 05	1 30	1 80	.....	.....
Fig. 467. Soft Seat Compression Gauge Cock, ..ca.	80	90	1 00	1 10	.....	.....
Fig. 577. Soft Seat with Stuffing-box .....each	1 00	1 10	1 20	1 30	.....	.....
Fig. 469. Ball Gauge Cock, ..ca.	.....	.....	.....	.....	90	1 00

PRICE LIST.

Mississippi Gauge Cock.

Number,	1	2	4
Cut for Pipe Thread, .....inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Fig. 468. Mississippi, .....each	75	1 00	1 50

All genuine Gauge Cocks are stambed with the name LUNKENHEIMER.

LUNKENHEIMER
SCALE REMOVING AND PREVENTING
"STANDARD" BOILER OIL INJECTOR.

Iron Body Brass Mounted or all Brass.

For Steam Boilers.



Fig. 492.
"Standard."

DESCRIPTION.

A—Oil Reservoir.
B—Sight-Feed.
C—Oil Drop Regulating Valve.
D—Stop Valve.
E—Filling Plug.

F—Drain Valve.
G—Sight-Feed Drain Valve.
H—Plug to renew Sight-Feed Glass.
J—Union Connection.

Lunkenheimer Scale Removing and Preventing "Standard" Boiler Oil Injector—Continued.

The "Standard" Boiler Oil Injector is intended to be attached to the feed water pipe of steam boilers to feed boiler oil into same, which effectually removes existing incrustations and prevents the formation of new scale; also preventing foaming, pitting and leaky joints. Many boiler explosions are caused by the weakening of the iron from strains due to unequal expansion. This unequal expansion is directly caused by the scale on the heating surface, also burning and blistering same. By accurate tests a scale $\frac{1}{32}$ of an inch requires 9 per cent more fuel; a scale $\frac{1}{16}$ of an inch 12 per cent; a scale $\frac{1}{8}$ of an inch 30 per cent, and a scale $\frac{1}{4}$ of an inch 60 per cent, and as the scale thickens the ratio increases. Thus it will be seen that by keeping the boiler clean and free from scale an enormous saving is effected. A GOOD QUALITY BOILER OIL WILL DO THE WORK, NO MATTER WHAT KIND OF WATER IS USED. LUNKENHEIMER'S "STANDARD" BOILER OIL INJECTOR has but one connection to the feed pipe, is simple and strong, and will be found a perfect machine for the purpose—visibly feeding drop by drop.

DIRECTIONS.

Attach the Injector to the Feed Water Pipe, between the Pump and the Boiler or Heater, but not to a vertical pipe in which the water flows downward at the point of connection. It is not necessary to attach the Injector directly to the feed water pipe—an intermediate piece of vertical pipe leading UP to the feed water pipe will not impair its working and always improves it. In some cases, especially where very heavy oil is used, it is best to attach it as stated above, as the extra length of pipe gives a greater hydrostatic pressure, and thus forces the oil out of the cup. In attaching to a horizontal pipe always place injector below same, so that the oil can flow upward.

TO OPERATE.—Close Stop Valve and Oil Regulating Valve and fill reservoir with Boiler Oil; then open Stop Valve and regulate feed of oil with Oil Regulating Valve.

TO REFILL.—Close Stop and Oil Regulating Valves drain water from reservoir; then proceed as before.

If feeder is attached between pump and heater it will also keep heater clean. All Injectors have $\frac{3}{4}$ inch pipe connection on shank.

PRICE LIST.

Capacity,	$\frac{1}{2}$ Pt.	1 Pt.	1 Qt.	$\frac{1}{2}$ Gal.	1 Gal.	1 $\frac{1}{2}$ Gal.	2 Gal.
Iron, Brass Trimmings,.....each	.....	.....	.....	16 50	19 50	22 50	30 00
Brass, Part Finished,.....each	7 50	10 00	13 50	.....	.....	.....	.....
Brass, All Finished,.....each	8 00	10 60	14 25	.....	.....	.....	.....
All Finished and Nickeled, each	8 50	11 20	15 00	.....	.....	.....	.....
Suitable for Boilers, .....H. P.	10	25	75	100	150	200	250

Reservoirs above one quart are of cast iron, and have lugs on body for bolting to place; smaller sizes have a brace-stud and lock-nut at lower end of oil chamber for same purpose.

LUNKENHEIMER

LOW WATER ALARM FOR STEAM BOILERS.



Fig. 451.

Low Water Alarm Applied to a Boiler.

Our Fusible Low Water Alarm is simple, practical and inexpensive and so easily attached that no Steam Boiler should be without one. It is an attachment almost as important and necessary to a Steam Boiler as a Steam Gauge or Safety Valve, and is reliable and cannot get out of order. It consists of a tube with one end reaching down to the low water line while the other has a valve and fusible plug attached.

The operation is as follows: when the water in boiler drops down below the end of the tube it drains the water out of same and permits steam to enter, which melts the fusible metal, and with a loud report the steam hisses through the pipe and thus gives notice of the approaching danger. The valve is then shut off, a new fusible disc attached, the valve opened and the alarm is again ready. Each alarm is supplied with several fusible discs and extra ones can be furnished at a small cost. Our Low Water Alarms are fully warranted to give satisfaction. Threaded for $\frac{3}{4}$ inch pipe thread.

PRICE LIST.

Low Water Alarm Complete with 3 Extra Fusible Discs,.....each	7 00
Extra Fusible Discs, .....per dozen	2 20

LUNKENHEIMER PRESSURE AND VACUUM GAUGES



Fig. 462.
Pressure Gauge.



Fig. 662.
Vacuum Gauge.



Fig. 663.
Combined Pressure and
Vacuum Gauge.

Improved Single Bourdon Spring Pressure or Vacuum Gauges.

PRICE LIST (including Cock).

Size.	Iron Case, Brass Ring.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.
12 inch Dial,	50 00	51 50	75 00	79 00
10 " "	32 00	33 00	40 00	43 00
8½ " "	22 00	22 75	30 00	32 50
6¾ " "	16 00	16 60	20 00	22 00
6 " "	13 00	13 50	16 00	17 50
5½ " "	10 00	10 25	12 00	13 25
5 " "	8 00	8 20	11 00	12 00
4½ " "	8 00	8 20	10 00	11 00
3¾ " "	7 00	7 18	9 00	9 75
3 " "	6 00	6 15	8 00	8 60
2½ " "	6 00	6 15	8 00	8 60

Combined Pressure and Vacuum Gauges.

PRICE LIST (including Cock).

Size.	Iron Case, Brass Ring.	Iron Case, N. P. Ring.	Brass Case.	N. P. Case.
12 inch Dial,	60 00	61 50	80 00	84 00
10 " "	40 00	41 00	50 00	53 00
8½ " "	30 00	30 75	40 00	42 50
6¾ " "	20 00	20 60	25 00	27 00
6 " "	16 00	16 50	20 00	21 50
5½ " "	14 00	14 25	16 00	17 25
5 " "	14 00	14 25	16 00	17 25
4½ " "	12 00	12 20	14 00	15 00
3¾ " "	10 00	10 18	12 00	12 75

We are prepared to supply at reasonable prices gauges of all kinds. These articles are reliable, durable and guaranteed in every respect.



Fig. 464.

Lunkenheimer Steam Gauge Syphons.

BRASS AND IRON.

We do not guarantee steam gauges unless they are attached with a syphon. These syphons are durable and cheap and no steam gauge should be connected without one between it and the boiler.

PRICE LIST.

Size Pipe Thread.....	inch	¼
Iron.....	each	50
Brass, Finished.....	each	1 80
Brass, Nickel Plated.....	each	2 00

LUNKENHEIMER SCOTCH GLASS TUBES, CUTTERS AND FUSIBLE PLUGS.



Fig. 465. Scotch Glass Tube.

PRICE LIST.

Length,.....inches	10	11	12	13	14	15	16	17	18	19	20	22	24
$\frac{1}{2}$ or $\frac{3}{8}$ in. diameter,.....per dozen	3 00	3 24	3 60	3 84	4 20	4 44	4 80	5 04	5 40	5 64	6 00	6 60	7 20
$\frac{3}{4}$ in. diameter,.....per dozen	3 60	3 96	4 32	4 80	5 16	5 52	5 88	6 24	6 60	7 08	7 44	8 16	8 88

Prices on Glass Tubes longer than 24 inches upon application.



Fig. 652. Glass Tube Cutter.

This Cutter will be found to combine the advantages of both cheapness and serviceability. Each one is packed in a suitable box.

PRICE LIST.

Cutters,	each	60
Extra Cutter Wheels	per dozen	2 40

Lunkenheimer Fusible Plugs.



Inside Type.
Fig. 463-A.



Outside Type.
Fig. 463-B.

These Plugs are made of bronze, filled with pure Banca tin and our name stamped thereon as manufacturers. The construction fulfills the requirements of Sec. 4436 of the U. S. Revised Statutes and in all details with Sec. 26, Rule 2, Regulations of the Board of Supervising Inspectors of Steam Vessels, and are accepted by all Local Inspectors. In ordering be particular to specify which type is desired.

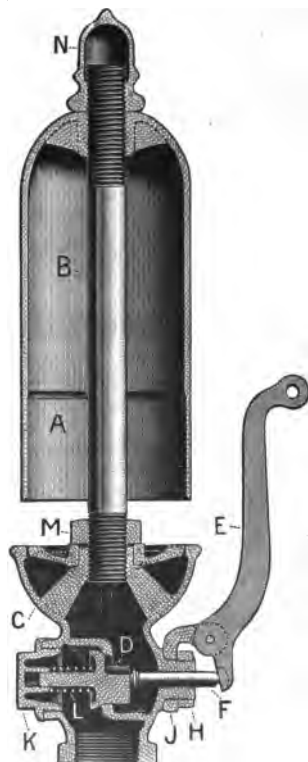
PRICE LIST.

Size,.....each	½	¾	1	1¼	1½	2
Fusible Plugs, .....each	60	75	1 00	1 50	2 00	3 00

SECTION IV.

WHISTLES AND WHISTLE
VALVES.

LUNKENHEIMER WHISTLES.



Our experience in the manufacture of whistles (covering a period of almost half a century) has enabled us to design a variety of types which cover every requirement of service.

We are illustrating and listing herein a variety of whistles, the extended use of which has made the Lunkenheim brand standard with the trade.

In developing the line we have sought to produce whistles which combine efficiency with durability in a greater degree than hitherto achieved by other makers of similar articles.

By efficiency in whistles we mean the production of the greatest volume of sound with the least expenditure of steam or air, and in durability we claim to supply a construction of a more substantial nature in respect to amount and kind of material and grade of workmanship than is to be found in the competitive makes of goods.

Wherever possible, we have used cast bronze bells on account of their supe-

Whistles—Continued.

riority of tone, over tubing bells used in common makes of whistles. The size of the aperture through which the steam or air is discharged has been correctly proportioned for each size of whistle, with a view of not using any more steam or air than absolutely necessary to secure the maximum volume and intensity of sound required.

Where large whistles are required to be heard a considerable distance, we prefer to correspond direct with the users in order that we may ascertain conditions of installation. Cities and towns often desire to install whistles to be used for fire alarm and other signal purposes, and we will be glad to be permitted to advise as to what size and type of whistle is best adapted for each particular requirement. When writing on this subject, give lowest pressure at which whistle is to be blown, largest size pipe connection available and description of topographical conditions of surroundings where whistle is to be located.

Each particular type of whistle is described in detail on the following pages.

DIRECTIONS FOR CONNECTING.

To give best results, whistles should be placed as nearly as possible over the boiler and above surrounding buildings, so that the sound will not be obstructed. If they are so placed that there are a number of bends and off-sets in the connecting pipes, or the whistle is a considerable distance from the boiler, the whistle valve should be directly under the whistle and a second valve (an ordinary stop valve) should be placed at the bottom of the pipe. Means should be provided for draining the connecting pipes by placing a small drain cock directly above the lower valve. If the whistle is not too far from the boiler, the whistle valve can be placed at the bottom of the connecting pipes instead of directly under the whistle. When operating a whistle connected as above, the drain cock should be first opened to allow any condensed water (which may have accumulated in the pipes) to escape. If a stop valve is used at the bottom of the pipe, open same a moment or so before operating the whistle valve so as to heat the pipe and get dry steam to the whistle. They should not be attached to steam pipes used to supply steam for other purposes.

Use as little lead or pipe joint grease as possible in connecting the pipes and blow out thoroughly before connecting the whistle.

Take the steam supply directly from the dome of the boiler, if possible, so that it will be dry and of maximum pressure, and avoid all unnecessary elbows, etc.

The whistle bell must be set at the proper distance from the slot in the top of the base to suit the steam pressure. To regulate this: loosen the acorn-shaped lock nut on top of the bell and screw the bell down or up until it blows satisfactorily. For higher pressures screw the bell up and for lower, down. When properly adjusted be sure to again tighten the lock nut.

We call particular attention to the fact that it is not necessary to order larger pipe connections than those which we have adopted for our whistles, as no better results can be obtained and furthermore an extra charge will be made when whistles are ordered with larger pipe connections.

We are prepared to supply electrically operated whistles and invite correspondence in relation to such installations; particulars on application.

All types of whistles, sizes 12 inches and above, when ordered with valve are furnished with our Automatic Balanced Whistle Valve, shown on page 232, as valves for these sizes of whistles without the balanced feature are difficult to operate.

All genuine Whistles have the name LUNKENHEIMER on same.

LUNKENHEIMER BRASS STEAM WHISTLES.



Fig. 441.
All Brass with Adjustable Lever.



Fig. 442.
All Brass without Valve.

The whistles illustrated above will be found on examination to be stronger in construction and neater in appearance than any other make on the market. The bell, which is dome-shaped at its upper end, is securely supported by a stem which screws through the dome and is held in place by an acorn-shaped nut. The lower end of the central stem is adjustably screwed into the base of the whistle and secured by a jam-nut. The bell can be raised or lowered to suit different steam pressures by simply loosening the acorn at the top when the bell can be screwed up or down, and when properly adjusted, the acorn is again tightly screwed in place acting as a lock nut. The lever is adjustably connected to the valve and can be placed in any position desired.

All of our whistles are made of the best materials and are fully warranted.
See pages 220 and 221 for a further description and directions.

PRICE LIST.

Diameter of Bells,....in.	1	1 1/4	1 1/2	2	2 1/4	3	3 1/2	4	5	6	8	10	12
Size of Pipe Connection, .....inches	3/4	3/4	3/4	1/2	3/4	3/4	1	1 1/4	1 1/2	1 1/2	2	2 1/2	3
Brass Whistles with Adjustable Lever, Fig 441, ea.	3 10	3 75	4 00	5 50	6 50	8 50	11 50	15 00	22 50	33 00	95 00	210 00	320 00
Brass Whistles without Valve, Fig. 442,.....each	2 20	2 75	3 00	4 35	5 25	7 25	9 50	12 00	19 00	24 00	70 00	150 00	290 00

All genuine whistles have the name LUNKENHEIMER cast on the base.

LUNKENHEIMER

LONG BELL, BRASS BASE WHISTLES, WITH OR
WITHOUT VALVES.



Fig. 802.
Without Valve.



Fig. 803.
With Valve and Adjustable Lever.

The construction of these whistles is similar to that of those described on the opposite page, the only difference being that the length of the bell is three times its diameter. The lever is adjustably connected to the valve and can be placed in any position desired.

For a further description and directions see pages 220 and 221.

PRICE LIST.

Diameter of Bell, in.	1	1¼	1½	2	2½	3	3½	4	5	6	8	10	12
Size of Pipe Connections, inches	¾	¾	¾	½	¾	¾	1	1¼	1½	1½	2	2½	3
Long Bell, Brass Base Whistle, with Valve, Fig. 803, each	4 60	5 50	6 00	7 80	9 80	12 80	17 00	22 50	34 00	49 50	145 00	315 00	480 00
Long Bell, Brass Base Whistle, without Valve, Fig. 802, each	3 30	4 20	4 50	6 50	8 00	12 00	13 30	18 00	28 50	36 00	105 00	225 00	435 00
Extra Long Bell, Brass Base Whistle, with Valve, Fig. 166, ea	6 10	7 25	8 00	10 00	13 00	17 00	22 50	30 00	46 00	66 00	195 00	420 00	640 00
Extra Long Bell, Brass Base Whistle, without Val. Fig. 165, ea	4 40	5 70	7 00	8 70	10 80	16 60	17 10	24 00	38 00	48 00	140 00	300 00	580 00

All genuine whistles have the name LUNKENHEIMER on the base.

LUNKENHEIMER

IRON BASE BRASS BELL STEAM WHISTLE.



Fig. 443.

The above with brass bell and iron base supplies the demand for a low priced whistle and in every way fulfills the requirements for a durable, substantial and neat device. The construction of the whistle is the same as that described on page 222. For a general description see pages 220 and 221. Iron Base Whistles are not furnished with valves, but they can be readily attached to the Improved Whistle Valve with Adjustable Lever, illustrated and described on page 234, or to the Balanced Whistle Valve shown on pages 232 and 233.

PRICE LIST.

Diameter of Bells .....inches	3	3½	4	5	6	8	10	12
Size of Pipe Connections .....inches	¾	1	1¼	1½	1¾	2	2½	3
Iron Base Whistles without Valve, Fig. 443, each	5 50	7 25	10 00	16 00	23 00	55 00	125 00	250 00
Iron Base Whistles, Long Bell, without Valve, Fig. 337 .....each	8 30	11 00	15 00	24 00	34 50	83 00	185 00	375 00
Iron Base Whistles, Extra Long Bell, without Valve, Fig. 164 .....each	11 00	14 80	20 00	32 00	46 00	110 00	245 00	500 00
All Iron Whistles, Extra Long Bell, without Valve, Fig. 336 .....each						50 00	100 00	200 00

All genuine Whistles have the name LUNKENHEIMER on same.

**LUNKENHEIMER
THREE-WHISTLE CHIME.**

All Brass or Brass Bells Iron Bases and Branch.



Fig. 450.

The above consists of three different size brass steam whistles described on page 222 attached to a suitable branch. They are carefully tuned, and will produce a pleasant, harmonious sound, which can be heard for quite a distance.

We are prepared to make special chimes to order, and will be pleased to furnish prices on application. To insure a prompt answer, we suggest that a sketch be sent with the inquiry, giving diameter and length of bells, number of whistles desired, and size of pipe connection.

Branches can be had made of bronze instead of iron, but, unless otherwise specified, they will be furnished of iron.

Notice.—Whistle Valves for above are extra, and chimes will be sent complete with valve unless otherwise ordered. Orders received for three-whistle chimes, in which the diameter and length of bells are given, will be furnished, but we will not guarantee them to harmoniously chime.

PRICE LIST.

No. 1	{	Size Pipe Connection.....inches	1
		Composed of one each 1½, 2 and 2½ inch Whistles, Iron Branch, Fig. 450.....	22 00
		Composed of one each 1½, 2 and 2½ inch Whistles, Brass Branch, Fig. 804.....	27 00
No. 2	{	Size Pipe Connection.....inches	2
		Composed of one each 3½, 4 and 5 inch Whistles, Iron Branch, Fig. 450.....	40 00
		Composed of one each 3½, 4 and 5 inch Whistles, Brass Branch, Fig. 804.....	66 00
No. 2½	{	Size Pipe Connection.....inches	2
		Composed of special short Whistles (very shrill), Iron Branch, Fig. 450.....	50 00
		Composed of special short Whistles (very shrill), Brass Branch, Fig. 804.....	80 00
No. 3	{	Size Pipe Connection.....inches	3
		Composed of one each 5, 6, and 8 inch Whistles, Iron Branch, Fig. 450.....	109 00
		Composed of one each 5, 6 and 8 inch Whistles, Brass Branch, Fig. 804.....	160 00
No. 3½	{	Size Pipe Connection.....inches	3
		Composed of special long Whistles (very harmonious), Iron Branch, Fig. 450.....	130 00
		Composed of special long Whistles (very harmonious), Brass Branch, Fig. 804.....	190 00

All genuine Chimes have the name LUNKENHEIMER cast on the branch.

LUNKENHEIMER

“MOCKING-BIRD” WHISTLES.

Patented,



Fig. 445.
All Brass with Valve.



Fig. 377.
All Brass without Valve.

This is a simple and practical variable sound Steam Whistle, especially adapted for Traction Engines, Locomotives, Steamboats, Factory and Mill use. It makes an excellent fire alarm, and is attached like any ordinary whistle. The bell is provided with a piston, which is pulled downward by a chain running between pulleys, and when not in use, is always at the top, being drawn upwards by means of a spring.

To Change the Sound, Pull the Chain.

The dome-shaped bell is securely supported at its base by a three-armed prong, the stem of which is adjustably screwed into the whistle base, and fastened by jam-nut B. Owing to this construction, the lower edge of the bell is always exactly in line with the slot in the base through which the steam escapes, thereby insuring best results and a perfect, clear and loud tone. The bell must be raised or lowered to suit the steam pressure by screwing same up or down, and when properly set, fastened by jam-nut B. Made of the best materials and fully warranted.

For a general description of Lunkenheim Whistles see pages 220 and 221.

PRICE LIST.

Diameter of Bell. ....inches	2½	3	3½	4	5	6
Size of Pipe Connection.....inches	¾	¾	1	1¼	1½	1½
All Brass, with Valve, Fig. 445.....each	10 50	14 00	20 00	28 00	40 00	56 00
All Brass, without Valve, Fig. 377.....each	9 00	12 00	17 50	25 00	37 00	50 00
Iron Base, without Valve, Fig. 348.....each		11 50	16 50	23 00	34 00	46 00

All genuine whistles have the name LUNKENHEIMER on the base.

LUNKENHEIMER
IMPROVED COMBINATION OR FIRE ALARM
WHISTLE.

PATENTED.



Fig. 446.
Complete with Valve.

This Whistle is designed to answer both the purpose of an ordinary whistle as well as that of a Fire Alarm. Thousands are in use for Fire Alarm signal purposes in towns and villages throughout the world. It is provided with a piston that can be moved up or down within the bell or tube, thus changing the interior length of same, and consequently, also the sound of the whistle. When the piston is not operated the whistle gives but a single note, like any ordinary whistle, but when the piston is moved up and down, a howling, penetrating noise is produced. When placed above the roof of a building, an extension rod should be coupled to the piston stem and a rope or wire to the whistle valve lever. The bell is dome-shaped at its upper end and at its lower securely supported by a three-armed spider, the stem of which is adjustably screwed into the whistle base and fastened by jam-nut E. Owing to this construction the lower edge of the bell is always exactly in line with the slot in the base through which the steam escapes, thereby insuring best results and a perfectly clear and loud tone. The bell is raised or lowered to suit steam pressure by screwing it up or down, and when properly set, is fastened by jam-nut E. All our whistles are made of best materials and fully warranted.

For general description of whistles see pages 220 and 221.

PRICE LIST.

Diameter of Bells,.....inches	2½	3½	5	8
Size Pipe Connection,.....inches	¾	1	1½	2
With Whistle Valve Complete, Iron Base, .....each	24 00	31 00	40 00	100 00
With Whistle Valve Complete, Brass Base, .....each	30 00	40 00	53 00	120 00

All genuine Whistles have the name LUNKENHEIMER on the base.

LUNKENHEIMER SINGLE BELL CHIME WHISTLES.

Screw Ends.



Fig. 447.
All Brass with
Adjustable
Lever.



Fig. 448.
All Brass without
Valve.



Fig. 449.
Locomotive Style
with Upright
Valve.

The Single Bell Chime Whistles shown above differ essentially from other makes, inasmuch as the bells are bronze and cast in one piece instead of being made in several parts. Owing to this method of construction they give clear, bell-like, musical sounds, which are much more pleasing to the ear than those produced by common whistles.

The appearance of our whistles is unique and handsome, they are well made, perfectly tuned, and for durability of construction are unequalled.

For a general description of whistles see pages 220 and 221.

PRICE LIST.

Diameter of Bells, ..inches	1½	2	2½	3	3½	4	5	6	8	10	12
Size of Pipe Connection, ..inches	¾	¾	¾	¾	1	1¼	1½	1½	2	2½	3
All Brass with Adjustable Lever, Fig. 447, ..each	7 00	10 00	13 00	16 00	22 00	28 00	44 00	60 00	145 00	235 00	400 00
All Brass without Valve, Fig. 448, ..each	5 50	8 50	10 50	13 50	18 50	24 00	37 00	49 00	120 00	188 00	370 00
Iron Base without Valve, Fig. 985, ..each	.....	.....	.....	12 00	16 50	22 00	33 00	45 00	108 00	155 00	340 00
All Brass Locomotive Style, Fig. 449, ..each	.....	.....	.....	.....	.....	27 50	43 00	59 00	.....	.....	.....

All genuine Whistles have the name LUNKENHEIMER on them.

LUNKENHEIMER
SINGLE BELL CHIME WHISTLE.

ALL BRASS.

Flange End.



Fig. 841.

With the exception that the above is furnished with flange end, it is identical with Fig. 448 shown on opposite page.

See pages 220 and 221 for a general description of whistles.

Prices on application.

All genuine Whistles have the name LUNKENHEIMER cast on the base.

LUNKENHEIMER
PNEUMATIC WHISTLES.**For Gasoline and Steam Launches or Motor Boats.****Fig. 181.**
One Whistle.**Fig. 180.**
Two Whistles.**Fig. 179.**
Three Whistles.

The Lunkenheimer Pneumatic Whistles were principally designed for use on Motor Boats, though the same can be applied to a number of other cases, wherever steam or compressed air is not available, though it is desired that a whistle be used.

As shown by the illustrations above, the whistles are blown by means of a hand pump which is easily operated.

One stroke of the piston will produce a blast of five seconds duration and hence all requirements of the law for boat purposes are fully met.

The sound produced is harmonious and very pleasing to the ear. It can be heard for quite a distance, owing to which the whistles are particularly adapted for boat purposes.

The Lunkenheimer Pneumatic Whistles with hand pump are made in three styles, as shown in cuts. They are correctly tuned and the delightful true tone produced makes the whistles very desirable.

Pneumatic Whistles.—Continued.

They are elegantly finished, and present a fine appearance. Owing to their simple and practical construction, there is positively nothing about them that can get out of order, and being positively operated there is no liability of their not responding to the slightest operation of the piston.

Any intensity of sound can readily be produced, it simply requiring a quick action of the piston to produce a loud sound or a slow movement for a mild tone.

We are also prepared to furnish whistles in which the piston is operated by means of the foot. Whistles operated in this manner are principally used on automobiles, where a loud, quick blast is desired. Here the cylinder is very short but quite large in diameter, thereby necessitating but a slight movement of the piston to produce a sufficient volume of sound. The piston is forced to the top of the cylinder by means of a spring, permitting of quick, successive operations.

We also list herewith low-pressure whistles without pump, which can be applied to a number of uses wherever the pressure available is very low. They can be operated by means of the exhaust from gas or gasoline engine cylinders, and are applicable to either gasoline launches or automobiles propelled by gasoline engines. The whistles are so designed that but a slight force of air is required to produce a loud, far-reaching tone.

We fully guarantee our whistles and can safely assure perfect satisfaction.

When ordering be sure to specify whether wanted with one, two or three whistles, with or without pump, and particularly for what purpose the whistles are desired.

PRICE LIST.

Pneumatic Whistle, with Pump, complete with one Whistle, Fig. 181,.....each	36 00
Pneumatic Whistle, with Pump, complete with two Whistles, Fig. 180,.....each	43 00
Pneumatic Whistle, with Pump, complete with three Whistles, Fig. 179,.....each	50 00
Single Low Pressure Whistle, Fig. 160,.....each	17 00
Two Whistles on Branch, for Low Pressure, Fig. 161, .....each	20 00
Three Whistles on Branch, for Low Pressure, Fig. 162, .....each	25 00

All genuine Whistles have the name LUNKENHEIMER on same.

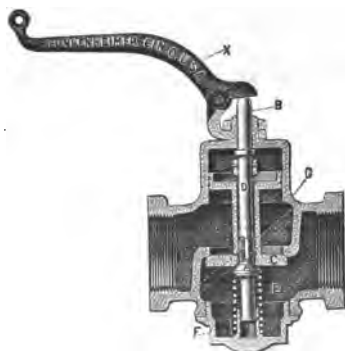
LUNKENHEIMER
AUTOMATIC BALANCED WHISTLE VALVE.
BRASS.



Fig. 691.
Screw Ends.



Fig. 692.
Flange Ends.



Sectional.

The form of whistle valve shown herewith effectually overcomes the difficulties that steam users have experienced with the old style of valve. Under high steam pressures it is very difficult to operate the ordinary whistle valves and to keep them tight. In them the disc is not balanced, and as they close with the steam pressure the continual pounding on the seat soon causes them to become leaky and troublesome.

Automatic Balanced Whistle Valve—Continued.

Recognizing the demand for a more durable and satisfactory valve, we have designed the Lunkenheimer Automatic Balanced Whistle Valve. This valve can be operated very easily under the highest steam pressures, and can be kept tight without difficulty. In this new form of valve the disc is balanced at all times, and when the valve is closing it does not hammer on the valve seat, but closes firmly and without any shock or jar. In opening, the steam pressure acts upon the valve disc in such a manner that the disc is raised from its seat almost automatically.

Reference to the sectional cut will show its operation. The steam pressure on disc C normally holds it to its seat. A slight pull on the lever X is sufficient to open the small auxiliary valve A. This admits steam through the opening in the center of stem of valve C to expansion chamber, where it acts upon the piston D, the area of which, being equal to that of valve C, practically balances it, and with only a slight additional pressure the valve is opened wide. As long as the auxiliary valve A is held open the main valve C will be kept off its seat, and steam will pass through the valve. When the pull on the lever is released the pressure of the steam closes the auxiliary valve A, and the main valve C closes easily and without shock or jar, as the steam which is entrapped in the balancing expansion chamber tends to cushion and retard its movement. There is very little wear on the two valve seats, and they can be easily reground by taking off cap at end.

A very important feature in the design of the Lunkenheimer Automatic Balanced Whistle Valve is the fact that access can be had to all the working parts of the valve by simply removing the cap screwed in the bottom of the valve. It will be noticed that the disc is guided at both top and bottom, thereby insuring the proper seating of same.

These Whistle Valves are made of a very high grade bronze composition, and are substantially and durably constructed. They are made in all sizes from 1 to 3 inches inclusive, with screw, flange, or screw and flange ends, and are guaranteed for 175 pounds working pressure.

PRICE LIST.

Size of Valve, .....inches	1	1½	1½	2	2½	3
Screw Ends, Fig. 691,.....each	18 00	22 20	26 60	35 50	44 40	62 20
Screw and Flange Ends, Fig. 335,.....each	21 40	26 00	31 80	41 80	51 00	74 80
Flange Ends, Fig. 692,.....each	22 20	27 50	33 60	43 80	53 20	77 00

Extra heavy pattern for 300 pounds working pressure can also be furnished, prices upon application.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
WHISTLE VALVE.
BRASS.



Fig. 444.

For a lower priced Whistle Valve than that shown on pages 232 and 233 we offer the above. This is not a balanced valve, but it is strong and durable, and for small whistles, or large ones where the pressures used are not very high, the valve will readily serve the purpose. It is provided with adjustable lever, enabling the placing of same in any desired position. Another important feature is that the valve can be reground should the seat become slightly worn. The areas through the valve are very large, the pipe ends have long, full and perfect threads, and there are few parts, hence the valve will stand long and severe usage.

PRICE LIST.

Size, .....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Brass, .....each	2 00	2 00	2 50	3 00	3 50	5 00	6 00	9 00	18 00	27 00

All genuine Whistle Valves have the name LUNKENHEIMER cast on the body.

SECTION V.

GROUND KEY WORK.

LUNKENHEIMER

GROUND KEY WORK.

As compared with a number of other makes, the first cost of Lunkenheimer Ground Key Work is probably a trifle higher, but a trial will soon convince those who have used inferior makes that Lunkenheimer goods are by far the cheapest in the end. It is not reasonable to suppose that a good article can be had for the same price as an inferior one, but if results are considered, it is not difficult to judge which would be the one selected.

We earnestly invite a comparison between our work and that of other makers. In the first place, it will be found that the material in our products is far superior to that of others, and actual use will show that the service of the goods is in proportion to the quality of the material. The same difference exists in the workmanship. Every piece of Lunkenheimer Ground Key Work is well finished and machined and considerable time is spent in grinding the key or plug to a perfect bearing in the body of the cock. In proof of this we will guarantee any piece of ground key work of our manufacture to be perfectly tight when used to control oils, gasoline or other fluids which dissolve grease.

Each and every article is rigidly tested and carefully inspected before it is permitted to leave our factories, and for this reason we are enabled to guarantee our products in every respect.

We are prepared to furnish promptly all the varieties of ground key work illustrated and described in detail on the following pages.

All of our products have the name LUNKENHEIMER either stamped or cast on same, without which the article is not genuine.

LUNKENHEIMER CYLINDER COCKS.

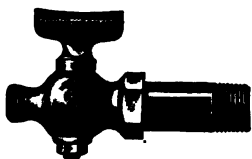


Fig. 470.
Short Shank, Tee Handle.

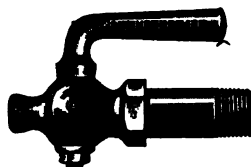


Fig. 471.
Short Shank, Lever Handle.

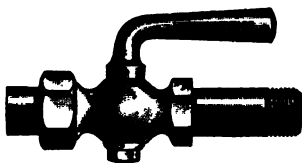


Fig. 472. With Lever Handle and Union.

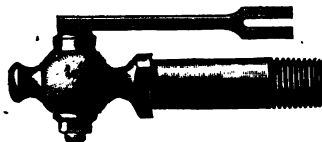


Fig. 473. For Traction Engines.

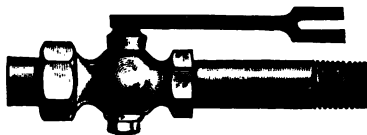


Fig. 975. With Union. For Traction Engines.

With the exception of the $\frac{3}{8}$ and $\frac{1}{2}$ -inch sizes, the unions on cocks furnished therewith are made one size smaller than the shank, unless otherwise specified. Cocks with blank shanks are furnished at a special discount from price list below.

See page 236 for a general description.

PRICE LIST.

Number,	1	2	3	4	6
Size of Shank Pipe Thread, .....inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Fig. 470, T. H. Cylinder Cock	75	85	95	1 25	2 25
Fig. 972, T. H. Cylinder Cock, with Long Shank,	80	1 00	1 25	1 35	2 50
Fig. 471, L. H. Cylinder Cock.....	90	1 00	1 10	1 50	2 50
Fig. 973, L. H. Cylinder Cock, with Long Shank,	1 00	1 15	1 35	1 65	2 75
Fig. 472, L. H. Cylinder Cock, with Union,.....	1 40	1 50	1 60	1 75	3 00
Fig. 473, Traction Cylinder Cock,	1 15	1 30	1 40	1 85	.....
Fig. 975, Traction Cylinder Cock, with Union,.....	1 70	1 80	1 95	2 20	.....

Unless otherwise ordered, L. H. Cylinder Cocks will be sent with angle, and T. H. with straight outlets.
For dimensions, see page 440.

LUNKENHEIMER
STEAM GAUGE COCKS.



Fig. 474.
Female Ends, Tee Handle.



Fig. 475.
Male and Female Ends, Tee Handle.

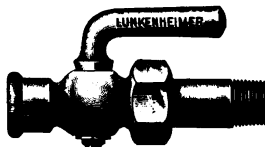


Fig. 979.
With Male Union, Female End and Lever Handle.

For a general description see page 236. The keys are carefully ground in the bodies, are well finished and can be positively relied upon.

Cocks with blank shank are furnished at a special discount from price list below.

PRICE LIST.

Number,.....	1	2	3
Size of Shank Pipe Thread,.....inch	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{4}$
Fig. 474, T. H. Steam Gauge Cock, Female Ends,.....each	75	85	95
Fig. 977, L. H. Steam Gauge Cock, Female Ends,.....each	90	1 00	1 10
Fig. 475, T. H. Steam Gauge Cock, Male and Female Ends,.....each	.75	85	95
Fig. 978, L. H. Steam Gauge Cock, Male and Female Ends,.....each	90	1 00	1 10
Fig. 979, L. H. Steam Gauge Cock with Union. ....each	1 40	1 50	1 60

All genuine Steam Gauge Cocks have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER AIR COCKS.



Fig. 476.
Tee Handle and Hexagon.

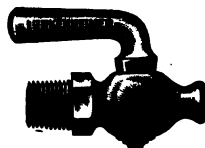


Fig. 980.
Lever Handle and Hexagon.



Fig. 477.
Tee Handle, Double End.

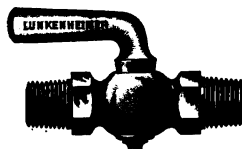


Fig. 981.
Lever Handle, Double End.



Fig. 478.
Tee Handle and Bibb Nose.

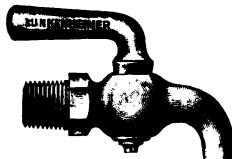


Fig. 479.
Lever Handle and Bibb Nose.

A general description of Ground Key Work is given on page 236. To insure prompt delivery, give the Figure Numbers when ordering.
An extra charge will be made for Cocks furnished with blank shank.

PRICE LIST.

Number,	1	2	3	4
Size of Pipe Thread, .....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
T. H. and Hexagon Air Cock, Fig. 476, .....each	40	50	60	80
L. H. and Hexagon Air Cock, Fig. 980, .....each	50	60	70	90
T. H. Double End Air Cock, Fig. 477, .....each	50	60	70	1 00
L. H. Double End Air Cock, Fig. 981, .....each	60	70	80	1 10
T. H. Bibb Nose Air Cock, Fig. 478, .....each	65	75	90	1 10
L. H. Bibb Nose Air Cock, Fig. 479, .....each	75	85	1 00	1 20
T. H. Bibb Nose Air Cock, Hose End, Fig. 275, .....each	90	1 00	1 25	1 50
L. H. Bibb Nose Air Cock, Hose End, Fig. 274, .....each	1 00	1 10	1 35	1 75

LUNKENHEIMER STEAM BIBB COCKS.

Fig. 480.
Screwed for Iron Pipe.



Fig. 481.
With Union.

Unless otherwise specified, the unions furnished for the above have one size smaller pipe than the shank, with the exception of the $\frac{1}{4}$ inch size, on which the union and shank have the same size pipe. An extra charge will be made if ordered otherwise.

See page 236 for a general description.

PRICE LIST.

Size Iron Pipe,.....inch	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Fig. 480. Rough Steam Bibb,.....each	1 00	1 25	1 50	2 50	3 50	5 00	8 00	15 00
Fig. 480. Finished Steam Bibb,.....each	1 25	1 50	2 00	3 00	4 50	6 00	10 00	18 00
Fig. 481. Rough Steam Bibb with Union on Nose,....each	1 25	1 50	2 00	3 00	4 50	6 00	10 00	18 00
Fig. 481. Finished Steam Bibb with Union on Nose, each	1 50	1 75	2 50	3 50	5 50	7 00	12 00	20 00

LUNKENHEIMER

GAS SERVICE AND METER COCKS.

BRASS.



Fig. 452.
Service Cock—Flat Head.



Fig. 453.
Meter Cock—Flat Head.



Fig. 574.
Union Meter Cock—Flat Head.

See page 236 for a general description of Lunkenheimer Ground Key Work. The above are in every way perfectly reliable, the keys are carefully ground in the bodies and the cocks will be found to be absolutely tight.

When ordering always specify whether flat or square head or tee handle key is wanted. Unless otherwise ordered cocks with flat head keys are furnished.

PRICE LIST.

Size	inches	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
Gas Service Cocks, Fig. 452.....each	75	85	95	1 15	1 50	2 25	3 10	5 00	11 00	16 00	
Gas Service Cocks with Check Pin, Fig. 311,	90	1 00	1 10	1 35	2 70	2 50					
Gas Service Cocks, M. & F., Fig. 310.....each	1 00	1 00	1 30	1 40	1 95	3 00	4 25	6 00			
Gas Meter Cocks, Fig. 453.....each			1 30	1 40	1 95	3 00	4 25	6 00			
Union Meter Cocks, Fig. 574.....each			1 40	1 55	2 20	3 40	5 00	7 00			

LUNKENHEIMER LIQUOR COCKS.**BRASS.****Fig. 759. Loose Key Pattern.****Fig. 760. Tee Handle Pattern.****Fig. 761. Lever Handle Pattern.**

We desire to call the attention of the trade to the several patterns of Bibb Cocks shown herein. Lunkenheimer Bibb Cocks have been on the market for many years, and enjoy a high reputation for superior quality and durability, and are in no way to be compared with the cheap, leaky and flimsy kinds usually sold by hardware dealers.

Our make of Bibb Cocks is heavy and substantial in pattern, made of the best bronze, and are consequently very durable. The plug has ample bearing surface, is carefully ground in place and can not leak, yet it can be turned easily. The size is measured by the bore of the cock and not by the outside diameter of the shank, as is the case with the cheap kind. The general design is handsome and ornamental, and they can be supplied either finished brass or nickel plated. All are carefully tested before shipment and guaranteed first class in every particular.

Lunkenheimer Liquor Cocks—Continued.

The Loose Key pattern of cock, Fig. 759, is preferred by many for the reason that it cannot be tampered with by unauthorized persons. This pattern is positively locked and can only be opened by means of the key. Any of the patterns can be furnished either threaded to screw or with plain shanks to drive in barrels, but will be sent threaded unless otherwise specified. When ordering, always state exactly what pattern is required and whether finished brass or nickel plated, and where Loose Key Cocks are wanted, advise whether keys are wanted for each. Finished brass cocks will be sent unless nickel plated ones are specified. These cocks are not furnished with pipe thread on shanks unless specially ordered. The cuts show shanks with coarse taper thread to screw in wood.

See page 236 for a further description of our Ground Key Work.

PRICE LIST.

Diameter of Bore.....inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Loose Key Liquor Cocks, without key, Finished Brass.....each	2 50	3 20	4 50
Loose Key Liquor Cocks, without key, Nickel Plated.....each	2 70	3 40	5 00
Keys for Liquor Cocks, Finished Brass,.....each	30	30	50
Keys for Liquor Cocks, Nickel Plated.....each	40	40	60
Tee Handle Liquor Cocks, Finished Brass.....each	2 00	2 70	4 00
Tee Handle Liquor Cocks, Nickel Plated.....each	2 20	2 90	4 50
Lever Handle Liquor Cocks, Finished Brass.....each	2 00	2 70	4 00
Lever Handle Liquor Cocks, Nickel Plated.....each	2 20	2 90	4 50

LUNKENHEIMER STEAM STOP COCKS.

Medium Pattern.

BRASS.



Fig. 454.
Square Head,
Screw Ends.



Fig. 455.
Square Head with
Flange Ends.



Fig. 456.
Flat Head,
Screw Ends.

Lunkenheimer Steam Stop Cocks are made in two weights; *i. e.*, Medium and Extra Heavy Patterns. The Medium Pattern, illustrated and listed on this page, is guaranteed suitable for 150 pounds steam working pressure.

These stop cocks are well designed, have full opening, and the keys are carefully ground in and warranted perfectly steam tight. A general description will be found on page 236.

When ordering, be sure to specify figure numbers; otherwise all orders will be filled with square head cocks.

PRICE LIST.

Size.....inches	$\frac{1}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Medium Pattern—Square Head, Flat Head, Tee Handle.....each	85	85	1 00	1 25	1 70	2 35	3 70	4 85	7 30	14 50	22 50	38 50
Medium Pattern with Check Pin, Fig. 273, each	1 00	1 00	1 15	1 40	1 90	2 55	3 95	5 15	7 65	15 00	23 25	.....
Medium Pattern, M. & F. Fig. 272,.....each	1 35	1 35	1 45	2 00	2 50	3 00	5 35	6 75	9 85	17 50	25 75	.....
Medium Pattern, Flange Ends.....each	.....	.....	.....	4 75	5 50	7 30	9 70	11 75	18 00	27 50	43 00	62 00
Malleable Iron Levers.....each	.....	07	08	09	15	25	35	45	80	1 00	1 25	1 50

All genuine Steam Stop Cocks have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
STEAM STOP COCKS.

Extra Heavy Pattern.

BRASS.



Fig. 872.



Fig. 874.



Fig. 830.

Square Head, Screw Ends. Square Head, Flange Ends. Flat Head, Screw Ends.

These Cocks are similar to those illustrated on preceding page, but are designed and guaranteed to stand a working pressure of 300 pounds.

When ordering clearly state whether wanted with square head, flat head or tee handle. Unless otherwise specified they will be sent with square heads. When so ordered, these valves are furnished with male and female screw ends, or both ends male, prices for which will be sent on application.

See page 236 for a general description of Ground Key work.

PRICE LIST.

Size, inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{2}$	2	3	4	6	8	10	12	14	16	18	20	24	30	36	48	60
Ex. H'y Pattern, Square or Flat Head, or Tee Handle, Screw Ends, ea.	1 30	1 30	1 50	2 00	2 85	4 00	6 75	8 50	13 50	25 00	37 00	54 00	75 00							
Extra Heavy Pattern, Flange Ends.....each				6 50	7 75	10 00	14 25	17 25	27 00	41 00	63 00	84 00	120 00							

All genuine Steam Stop Cocks have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
THREE-WAY STEAM COCK.

Medium Pattern.

Screw or Flange Ends.

BRASS.



Fig. 573.

Screw Ends.
Square Head.

We guarantee, in every respect, our Medium Pattern Three-Way Steam Cocks, where the working pressures do not exceed 150 pounds per square inch. They are substantial and durable, and will remain perfectly tight, the keys being carefully ground in the bodies.

Unless otherwise specified, they are furnished with keys having three ports. An extra charge is made when they are ordered with two ports in the keys.

PRICE LIST.

Size, .....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Medium Pattern, Screw Ends, Fig. 573, each	2 00	2 20	2 50	3 00	3 75	5 75	7 15	11 00	18 75	26 00	50 00	70 00
Medium Pattern, Flange Ends, Fig. 571,.....each	6 80	7 75	8 75	11 25	14 75	17 75	27 00	38 25	57 00	85 00	121 00	

All genuine cocks have the name LUNKENHEIMER cast in the body.

LUNKENHEIMER
MEDIUM PATTERN PACKED PLUG STOP COCKS.
BRASS.



Fig. 806.
Screw Ends, Flat Head.



Fig. 808.
Flange Ends, Square Head.

These cocks differ from the ordinary pattern (shown elsewhere) inasmuch as the plug, or key, is held in the body by a bolted gland stuffing box. The keys are well ground in, and, as they are packed at the top, there can be no leakage outside the cock. They are made of gun-metal composition, well designed, of ample proportions and should not be confounded with cheap machine-ground stop cocks. They are carefully tested before shipment and guaranteed to be tight. This style of stop cock is also made in extra heavy pattern, which is illustrated on the following page. The above pattern is guaranteed for 150 pounds working pressure. For a general description of ground key work, see page 236.

PRICE LIST.

Size, .....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Medium Pattern, Screw Ends, Flat Head, Fig. 806 or Fig. 805 Square Head,.....each	2 40	3 20	4 50	7 20	9 50	14 20	29 00	45 00
Medium Pattern, Male and Female Ends, Fig. 807, .....each	3 80	4 70	5 70	10 40	13 20	19 20	35 00	51 50
Medium Pattern, Flange Ends, Fig. 808,..... each	5 90	7 00	9 50	13 20	16 40	24 90	42 00	65 50
Medium Pattern, Flange and Screw Ends, Fig. 809, .....each	4 40	5 40	7 30	10 60	13 50	20 40	36 50	56 80

All genuine Packed Plug Stop Cocks have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

**EXTRA HEAVY PATTERN PACKED PLUG
STOP COCKS.****BRASS.**

Fig. 811.
Screw Ends. Flat Head.



Fig. 813.
Flange Ends. Square Head.

With the exception that the above are very heavy throughout and are guaranteed for 300 pounds working pressure, they are otherwise identically the same as those shown on page 247.

The plugs are well ground in the bodies, and the areas through the bodies are in excess of the nominal diameter of the connecting pipe.

The cocks are strong and practically constructed, and perfect satisfaction is guaranteed.

When ordering be sure to specify what style is wanted, and whether with square or flat head.

PRICE LIST.

Size, .....Inches	½	¾	1	1¼	1½	2	2½	3
Extra Heavy Pattern, Screw Ends, Flat Head, Fig. 811, Square Head, Fig. 810,.....each	5 40	8 40	12 50	15 00	19 50	37 00	58 00	77 00
Extra Heavy Pattern, Male and Female Ends, Fig. 812,.....each	6 80	9 20	13 50	16 00	23 50	39 00	61 00	81 00
Extra Heavy Pattern, Flange Ends, Fig. 813, ea.	10 50	14 50	19 50	25 50	34 00	54 00	83 00	105 00
Extra Heavy Pattern, Screw and Flange Ends, Fig. 814,.....each	8 90	12 00	16 00	22 00	28 50	47 00	71 00	94 00

All genuine Packed Plug Stop Cocks have the name LUNKENHEIMER cast on the bodies.

LUNKENHEIMER

EXTRA HEAVY PATTERN PACKED PLUG THREE-WAY STOP COCKS.

BRASS.



Fig. 817
Screw Ends.
Square Head.

The Lunkenheim Extra Heavy Pattern Packed Plug Three-way Cocks are guaranteed to stand a working pressure of 300 pounds per square inch. They are very strong and durable, and the keys are carefully ground in the bodies. They are rigidly tested and carefully inspected and we fully guarantee them to give entire satisfaction.

When ordering be sure to specify whether square or flat head key is wanted. Unless otherwise ordered, they will be sent with square head keys.

The keys in our Three-way Cocks are furnished with but three ports unless otherwise ordered, when a special charge will be made. See page 236 for a general description of Ground Key Work.

PRICE LIST.

Size,..... inches	$\frac{1}{4}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Extra Heavy Packed Plug Three-Way Cocks, Screw Ends (Fig. 817),.....each	7 90	11 50	13 00	20 00	27 50	48 00	72 00	100 00
Extra Heavy Packed Plug Three-Way Cocks, Flange Ends (Fig. 818),.....each	13 00	18 00	21 50	35 00	38 00	70 00	95 00	155 00

All genuine Steam Stop Cocks have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
EXTRA HEAVY PACKED PLUG FOUR-WAY COCKS.

BRASS.



Fig. 278.
Screw Ends.

The above are guaranteed for working pressures up to 300 pounds. The keys are well ground in the bodies, which, together with stuffing box, prevents any leakage of water or steam. The Lunkenger cocks are well proportioned and present a free passage for the steam or water, the opening in both the body and key being in excess of the area of the connecting pipe.

When ordering be sure to specify whether square or flat head key is wanted. Unless otherwise specified, they will be furnished with square head. See page 236 for a general description of Ground Key Work.

PRICE LIST.

Size.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Extra Heavy Packed Plug Four-Way Cock,.....each	11 00	15 00	21 00	26 50	33 50	59 00	86 00	110 00

All genuine Four-Way Cocks have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
OIL AND THROTTLE COCKS.

BRASS.



Fig. 376.
Oil Cock.



Fig. 375.
Throttle Cock.

The above used in combination on pneumatic rock drills, fulfill all the necessary requirements dependent on oil and throttle cocks. When in use, they are connected by a tee coupling with the oil cock directly above the throttle and the remaining end of the tee is connected to the air pipe.

The cocks are very strong and durable, and owing to the superior grade of material used, coupled with high class workmanship, they will stand long and severe usage.

Page 236 gives a general description of our Ground Key Work.

PRICE LIST.

Size,	inch	1/2	3/4	1
Throttle Cock,	each..	1 75	2 40	3 50
Oil Cock,	each	2 00	2 95	3 95

All genuine Oil or Throttle Cocks have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

GAS ENGINE THROTTLE COCK.



Fig. 901.

The form of Stop Cock shown above is extensively used on gas engines to throttle the supply of gas to the mixer. The cock has a graduated dial C, so that the adjustment of the quantity of gas can be arrived at accurately. It is also provided with stop, so that the cock cannot be left turned on through carelessness.

The lever A fits loosely on the key, and, in case it is desirable to have the double indexed dial C in a reverse position from that shown in cut, the lever can be taken off and turned around and then secured by set screw B. The lever is brass, highly polished. The dial is accurately indexed to show degree of opening through cock.

These cocks are made of the best gun metal composition, well ground in and guaranteed perfectly tight, and will be found more durable than the ordinary kinds.

See page 236 for a general description of Lunkenheim Ground Key Work.

PRICE LIST.

Size.....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
Brass Finished Lever and Dial.....each	1 70	1 90	2 30	3 00	4 50	6 20	10 00	22 00
Brass Finished all over.....each	2 40	2 70	3 20	4 20	6 00	8 20	12 50	25 00

SECTION VI.

FITTINGS.

LUNKENHEIMER**FITTINGS.**

The Fittings illustrated on the following pages must not be confounded with what are known to the trade as "standard fittings." Our products are carefully made and are heavy and substantial throughout. Owing to the superior quality, combined with high class workmanship, we can assure the trade that it is not possible to procure fittings which would better withstand long and severe usage.

One of the most important features in the construction of fittings is the pipe threads. If they are not full and perfect a tight and safe joint can not be made, and the result is either a constant leakage or the threads will strip when the fitting is being attached. In the majority of cases the pipe ends have to be retapped, same being either too small to permit of the pipe being attached, or too large, in which case the fittings are absolutely useless. An inspection of our products will show that the threads are perfect in every way, being full and long, and we guarantee our goods to be exactly as represented. The pipe ends are in perfect line or at absolute right angles, the workmanship and material are beyond criticism and the fittings present an attractive appearance.

Our Medium Pattern Fittings are guaranteed for working pressures up to 175 pounds per square inch, while the Extra Heavy are intended for pressures up to 300 pounds.

We manufacture quite a large variety of Unions, suitable for various purposes, as set forth in the descriptive matter accompanying the illustrations on the following pages, and users have found them to be satisfactory in every respect.

Unless the name LUNKENHEIMER is either cast or stamped on the article, same is not genuine.

LUNKENHEIMER
COMPANION FLANGES.
IRON.

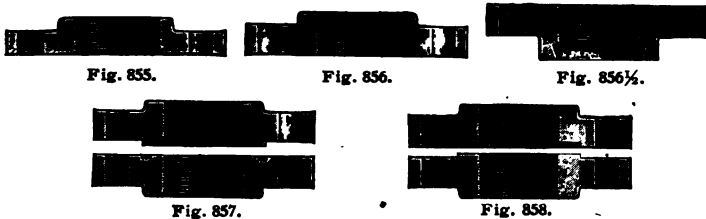


Fig. 855. Standard Flanges. Fig. 857. Heavy Tongue and Groove Flanges.
Fig. 856. Heavy Plain Flanges. Fig. 858. Heavy Male and Female Flanges.
Fig. 856 1/2. Heavy Plain Flange, with Caulking Recess.

When $\frac{1}{2}$ is affixed to figure number of flange it is understood that same is to have caulking recess in hub.

The flanges illustrated and listed on this page are made of close-grained hard iron, and carefully finished to size. The workmanship is first class and they are drilled to steel-bushed templets, insuring accurate spacing of bolt holes.

PRICE LIST.

STANDARD COMPANION FLANGES.					HEAVY TONGUE AND GROOVE AND MALE AND FEMALE COMPANION FLANGES.									
Size, Inches	Flanges, Faced	Flanges, F. and D.	Drilling One Valve Flange.	Bolts for One Joint	Size, Inches	Flanges, Faced	Flanges, F. and D.	Drilling One Valve Flange	Bolts for One Joint	Add for Tongue and Groove per Flange	Add for Male and Female per Flange	Add for Caulking Recess per Flange		
1 x 4	1 00	1 25	25	30	1 x 4 1/2	1 20	1 50	30	30					
1 1/2 x 4 1/2	1 05	1 35	30	30	1 1/2 x 5	1 25	1 55	30	30					
1 3/4 x 5	1 10	1 40	30	30	1 3/4 x 6	1 30	1 70	40	30	60	60	60		
2 x 6	1 20	1 50	30	30	2 x 6 1/2	1 40	1 80	40	30	60	60	60		
2 1/4 x 7	1 40	2 00	60	30	2 1/4 x 7 1/2	1 70	2 40	70	30	65	65	65		
3 x 7 1/2	1 60	2 25	65	30	3 x 8 1/2	1 90	2 70	80	60	65	65	65		
3 1/2 x 8 1/2	1 80	2 50	70	30	3 1/2 x 9	2 20	3 00	80	60	65	65	65		
4 x 9	2 15	3 00	85	40	4 x 10	2 60	3 60	1 00	90	65	65	65		
4 1/2 x 9 1/2	2 50	3 35	85	80	4 1/2 x 10 1/2	3 00	4 00	-1 00	90	65	65	65		
5 x 10	2 80	3 65	85	80	5 x 11	3 40	4 40	1 00	90	65	65	65		
6 x 11	3 20	4 05	85	80	6 x 12 1/2	3 80	4 90	1 10	1 30	80	80	80		
7 x 12 1/2	4 35	5 75	1 40	90	7 x 14	5 20	6 90	1 70	2 00	80	80	80		
8 x 13 1/2	5 00	6 50	1 50	90	8 x 15	6 00	7 80	1 80	2 10	1 00	1 00	1 00		
9 x 15	6 75	8 25	1 50	1 30	9 x 16	8 10	9 90	1 80	2 10	1 00	1 00	1 00		
10 x 16	7 75	9 25	1 50	2 00	10 x 17 1/2	9 30	11 10	1 80	3 10	1 00	1 00	1 00		
12 x 19	10 50	12 50	2 00	2 00	12 x 20	12 60	15 00	2 40	4 10	1 25	1 25	1 25		
14 x 21	13 75	16 00	2 25	3 00	14 x 22 1/2	16 50	19 30	2 80	4 30	1 60	1 60	1 60		
15 x 22 1/2	18 25	21 00	2 75	4 00	15 x 23 1/2	22 00	25 40	3 40	4 30	1 60	1 60	1 60		
16 x 23 1/2	22 50	26 00	3 50	4 00	16 x 25	27 00	31 20	4 20	5 60	2 00	2 00	2 00		

All bolts for flanges will be furnished with hexagon heads and hexagon nuts. All flanges are drilled in multiples of four, so that they may face on any quarter, and holes straddle center line. See drilling templets and dimensions of flanges on page 389.

We are prepared to furnish flanges on valves, also companion flanges of any diameter and thickness desired, but we recommend that the standards given on page 389 be followed, as they are almost universally used.

Gaskets for joints are extra. Corrugated Copper Gaskets can be supplied for tongue and groove or male and female flanges. Prices upon application.

THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

Brass Fittings—Continued.

PRICE LIST—ROUGH.

Fig. No.	Size, .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
670	Elbows, .....each	12	17	21	28	35	50	85	1 10	1 50	3 50	4 50	7 00	10 00
264	Elbows, Reducing, One Size, .....each	.....	22	26	35	45	62	1 10	1 40	1 90	4 40	5 65	8 75	12 50
263	Elbows, 45 Degrees,.....each	.....	20	25	35	50	75	1 15	1 50	2 25	4 25	7 00	9 00	10 00
262	Elbows, Side Outlet,.....each	.....	.....	25	40	45	75	1 50	1 80	.....	.....	.....	.....	.....
261	Elbows, Street,.....each	.....	.....	36	55	75	1 00	1 80	2 25	3 50	.....	.....	.....	.....
671	Tees, .....each	15	20	30	40	50	75	1 00	1 30	1 75	4 00	5 50	9 00	13 00
260	Tees, Reducing, One Size each	.....	25	38	50	63	95	1 25	1 65	2 20	5 00	6 90	11 25	16 25
259	Tees, Side Outlet,.....each	.....	.....	35	45	60	1 25	1 70	2 00	.....	.....	.....	.....	.....
672	Crosses, .....each	20	30	40	50	60	80	1 50	2 00	3 50	5 00	7 00	10 00	14 50
258	Crosses, Reducing, One Size, .....each	.....	38	50	65	75	1 00	1 90	2 50	4 40	6 25	8 75	12 50	18 00
257	Drop Elbows, Female, each	.....	25	30	40	55	85	.....	.....	.....	.....	.....	.....	.....
256	Drop Tees, Female,.....each	.....	.....	35	45	85	1 25	.....	.....	.....	.....	.....	.....	.....
679	Caps, each	15	15	20	25	35	45	60	80	1 10	2 00	3 00	.....	.....
680	Plugs,.....each	09	10	12	15	20	28	40	50	90	1 25	2 00	3 00	4 00
255	Reducers, Reducing One Size, .....each	.....	16	22	32	45	65	90	1 12	1 85	3 00	4 50	.....	.....
673	Couplings, .....each	10	14	16	25	37	50	60	90	1 35	2 40	3 50	.....	.....
254	Couplings, R. & L. ....each	.....	17	20	30	45	60	75	1 12	1 75	.....	.....	.....	.....
682	Lock Nuts, .....each	10	10	12	15	20	30	45	70	95	1 50	2 75	.....	.....
677	Nipples, Close, .....each	12	15	20	25	30	40	60	90	1 25	2 50	3 50	.....	.....
678	Nipples, S. & L. ....each	15	20	30	35	45	60	90	1 25	1 60	3 00	4 50	.....	.....
681	Bushings, Reducing One Size, .....each	.....	10	12	14	21	38	50	67	1 00	1 50	2 30	.....	.....
253	Bushings, Reducing Two Sizes, .....each	.....	.....	12	14	21	38	50	67	1 00	1 50	2 50	.....	.....
675	Return Bends, Open Pattern, .....each	.....	.....	40	50	1 00	1 35	2 00	3 00	4 50	.....	.....	.....	.....
674	Return Bends, Closed Pattern, .....each	.....	.....	35	40	75	1 15	1 65	2 50	4 00	.....	.....	.....	.....

LENGTH OF BRASS NIPPLES IN STOCK.

Size,.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Close, .....inches	$\frac{3}{4}$	$\frac{3}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3
Short,.....inches	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	4	4
Long,.....inches	2	2	2	2	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$
	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	3	3	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	4	4	5	5
	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	4	4	$4\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{1}{2}$	5	5	6	6

We carry in stock any of the above size nipples. For sizes larger than those given in table above, an extra charge will be made from that given in price list.

LUNKENHEIMER BRASS UNION ELBOWS AND TEES.



Fig. 547.
Elbow with Union.



Fig. 938.
Tee with Union.

To facilitate the connection of elbows and tees we are prepared to furnish the same with union, as illustrated above. They are guaranteed to stand a working pressure of 175 pounds per square inch, but, if desired, we can furnish an Extra Heavy Pattern for pressures up to 300 pounds. Prices on application.

BRASS UNION ELLS AND TEES. PRICE LIST.

Size,.....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Ells, Rough, Fig. 547,.....each	65	80	1 10	1 25	1 60	2 15	2 85	4 50
Tees, Rough, Fig. 938,.....each	85	1 10	1 45	1 65	2 15	2 95	3 80	6 00
Ells, Rough, Plated all over, Fig. 547,.....each	80	95	1 25	1 50	1 85	2 40	3 15	4 80
Tees, Rough, Plated all over, Fig. 938,.....each	1 05	1 25	1 55	2 00	2 45	3 20	4 20	6 40
Ells, All Finished, Fig. 547,.....each	80	1 00	1 35	1 70	2 10	2 80	3 75	5 35
Tees, All Finished, Fig. 938,.....each	1 05	1 35	1 80	2 25	2 80	3 75	5 00	7 10
Ells, Finished and Plated all over, Fig. 547,.....each	95	1 15	1 50	1 95	2 35	3 05	4 05	5 65
Tees, Finished and Plated all over, Fig. 938,.....each	1 25	1 45	2 00	2 50	3 10	4 05	5 40	7 55

LUNKENHEIMER BRASS AND IRON Y-FITTINGS, FLANGED.



Fig. 852.
Iron Y-Fitting. Flange Ends.

The above are very desirable fittings, and are suitable for a variety of purposes. They are used quite extensively in connection with pop valves, as illustrated and described on page 166.

These fittings can be had of either brass or iron, and, when ordering, be sure to specify what kind is desired. Unless otherwise specified, all orders will be filled with Iron Fittings.

PRICE LIST.

Size,.....inches,	Outlet Inlet	2 x 2	2 $\frac{1}{2}$ x 2 $\frac{1}{2}$	3 x 3	3 x 3	3 $\frac{1}{2}$ x 3 $\frac{1}{2}$	4 x 4
		3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6
Brass Y-Fitting, Flange Ends, Fig. 851,.....each		49 00	67 00	90 00	105 00	120 00	170 00
Iron Y-Fitting, Flange Ends, Fig. 852,.....each		18 00	22 00	28 00	32 00	36 00	53 00

**LUNKENHEIMER
BRASS UNIONS.**
Rough, Heavy or Finished Patterns.



Fig. 457.
Rough Heavy Government
Pattern Union, Ground Joint.



Fig. 458.
Finished Union, Ground
Joint.

Owing to the high grade of material and superior workmanship of our Unions, they are very strong and durable. The ball and socket joint permits of a slight deviation in the alignment of the pipe and at the same time insures a tight joint.

The Finished Brass Unions will readily withstand a working pressure of 150 pounds per square inch, while the Rough Government Unions are guaranteed for working pressures up to 250 pounds.

When ordering be sure to specify style desired.

PRICE LIST.

Size,.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Rough,.....each	35	40	55	75	1 00	1 40	1 90	2 75	4 00	6 50	8 50
Finished,.....each	32	36	50	70	90	1 25	1 70	2 50	3 60	6 00	7 75



Fig. 350.

**LUNKENHEIMER
BRAZING UNIONS.**
For Brass Tubing.



Fig. 217.

The above are well made in every respect, are neat in appearance, and if brazed to the tubing properly, the ball and socket joint cannot leak.

They are extensively used where tubing is frequently connected and disconnected, to facilitate access to some part of a machine, for instance, on automobiles, gasoline launches, etc.

PRICE LIST.

Size,.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Finished Brass, Fig. 350, each	15	17	20	35
Size,.....inches	Brazing End	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
	Pipe End.....	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$
Finished Brass, Fig. 217,.....each	20	25	35	40

All genuine Unions have the name LUNKENHEIMER on same.

LUNKENHEIMER
MEDIUM AND EXTRA HEAVY ROUGH AND
FINISHED BRASS HEXAGONAL UNIONS.



Fig. 303.

Medium Pattern, Finished.

Fig. 302.

Extra Heavy Pattern, Finished.



Fig. 300.

Extra Heavy Pattern, Rough.

Fig. 301.

Medium Pattern, Rough.

The unions illustrated above are of superior design, and with regard to material, workmanship and neatness, they have no equal. They are very strong and durable and will outlast any other make. They are made in Medium and Extra Heavy Patterns, and when ordering be sure to specify which pattern is wanted, and also whether finished or rough.

PRICE LIST.

Size,.....inches	¼	¾	¾	½	¾	1	1¼	1½	2	2½	3
Medium Pattern, Finished,.....each	40	50	65	90	1 10	1 60	2 10	3 40	4 80	7 80	10 50
Medium Pattern, Rough,.....each	35	40	55	75	1 00	1 40	1 90	2 75	4 00	6 50	8 50
Extra Heavy Pattern, Finished,.....each	55	75	1 05	1 30	1 80	2 90	4 30	6 60	9 20	.....	.....
Extra Heavy Pattern, Rough,.....each	50	65	95	1 15	1 55	2 70	3 90	6 30	8 80	.....	.....

All genuine Unions have the name LUNKENHEIMER on same.

LUNKENHEIMER

DOUBLE EXTRA HEAVY BARGE UNION.

BRASS.



Fig. 351.

These unions are used quite extensively wherever very long spans of pipe are run without support, such, for instance, as on barges. Here it is necessary that a very heavy union be used to stand the tremendous strain, and for this purpose we can safely recommend the above to the trade.

PRICE LIST.

Size,..... inches	1	1¼	1½	2	2½	3
Double Extra Heavy Unions,.....each	3 30	4 70	7 50	9 20	12 50	16 50

All genuine Unions have the name LUNKENHEIMER on same.

SECTION VII.

INJECTORS AND EJECTORS.

LUNKENHEIMER
AUTOMATIC INJECTOR.

**For Boilers of Stationary, Portable or Traction Engines,
Steamboats, Etc.**



Fig. 756.

The Lunkenheim Automatic Injector is a simple, durable and efficient boiler feeder, not liable to get out of order, and is fully guaranteed in every particular. It is warranted to give in actual service as good, if not better, results than are herein claimed for it.

We do not hold that these results are phenomenal as compared with the claims of others, but we do confidently assert that our machines will, in actual service, substantiate all our statements.

The Lunkenheim Automatic Injector will satisfy the most exacting engineer, as it will be found in practice to be reliably automatic under all ordinary conditions, to have full capacity at higher steam pressures than others, not affected to any extent by varying steam pressures, and the maximum amount of water delivered is capable of being graded over 50 per cent.

Lunkenheimer Automatic Injector.—Continued.

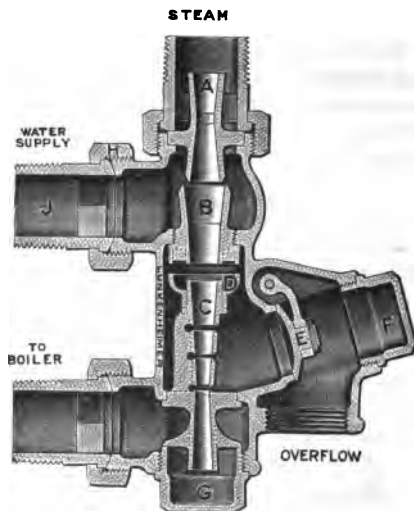
CAPACITY—The table of capacities has been taken from actual working tests and is not "estimated." Allowances have been made for contingencies, and if a new Lunkenheimer Injector is properly attached to a boiler and does not fulfill our guaranty, the user is at liberty to return it to us at our expense. We state plainly herein that all tests are made on a 5-foot lift, with steam pressures at 75, 85 and 95 pounds and feed water at 75 degrees F. We believe that these conditions are more severe than those under which other manufacturers test machines of this kind.

DURABILITY—The Lunkenheimer Automatic Injector is very durable because all parts are of good proportions. The machine is made entirely of brass and the tubes of a special hard bronze composition made expressly for the purpose. Owing to the construction of the tubes, the arrangement of the spill holes will not diminish the durability of the machine, as is the case with the other injectors of the automatic type. Another improved feature is, that the interior areas of the tubes are smaller than others for capacities claimed to be equal; hence the tubes of our injector will not wear out of size as rapidly as others. Every part about the injector is interchangeable, and new parts can be supplied to replace worn ones at slight expense.

EFFICIENCY—An impartial test will clearly show that the Lunkenheimer Injector excels in this particular. The range of work covered is very wide, as shown in table herein, and it can be graded over 50 per cent under all ordinary conditions. Our injector will deliver more water per pound of steam than any other, which means a saving in fuel. While the capacity of all injectors is diminished by long lifts and hot feed water, the capacity of the Lunkenheimer is less affected from such causes than any others.

AUTOMATIC—The Lunkenheimer Injector is absolutely automatic at all times, and can be relied upon to restart instantly after a temporary interruption of either the steam or water supply.

DESIGN—The exterior appearance of the machine is very handsome, as the brass body is wire brushed and the trimmings bright finished. All unions have ground joints and will come tight very easily. The Lunkenheimer machine again differs from other injectors of the automatic type inasmuch as the internal areas of the body are made larger than usual, which accounts for, in a large degree, the excellent working of the machine. The general construction of the body is very heavy and rigid so that same can not be sprung by the strain set upon it by the connecting pipes.

Lunkenheimer Automatic Injector.—Continued.**Sectional View.**

Attention is directed to the careful design exhibited in the above sectional view. The areas of the body are ample and the tubes are held securely in place, yet they can be readily taken out for examination or repair. All parts are made on the interchangeable plan and can be readily and easily renewed.

All injectors are carefully tested before shipment, and, besides being required to deliver their rated capacities, they must also be perfect in other respects. They will operate under the following range of steam pressures and lifts with the *feed water at 75 degrees F.*:

Lifts 2 to 4 feet,	at steam pressures from 20 to 160 lbs.
Lifts 4 to 8 feet,	at steam pressures from 30 to 160 lbs.
Lifts 8 to 12 feet,	at steam pressures from 40 to 140 lbs.
Lifts 12 to 16 feet,	at steam pressures from 45 to 100 lbs.
Lifts 16 to 18 feet,	at steam pressures from 50 to 90 lbs.
Lifts 18 to 20 feet,	at steam pressures from 55 to 80 lbs.

With steam pressures from 60 to 100 lbs. and feed water at 75 degrees F. the capacity of this injector can be graded over 50 per cent. Please bear in mind that the above table is based on using *feed water at 75 degrees F.* With cold water much better results can be secured on many points of working. When lifting five feet this injector *will handle hot water* under the following conditions:

Feed water 100 degrees F.,	at steam pressures from 20 to 130 lbs.
Feed water 110 degrees F.,	at steam pressures from 25 to 115 lbs.
Feed water 120 degrees F.,	at steam pressures from 30 to 95 lbs.
Feed water 125 degrees F.,	at steam pressures from 35 to 90 lbs.

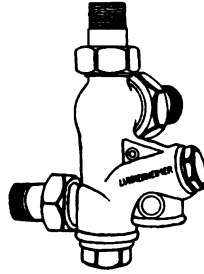
Lunkenheimer Automatic Injector.—Continued.
VARIOUS STYLES OF LUNKENHEIMER AUTOMATIC INJECTORS.

Fig. 756



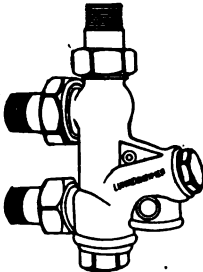
OVERFLOW FRONT.
SUCTION LEFT.
DISCHARGE BACK.

Fig. 993



OVERFLOW FRONT.
SUCTION RIGHT.
DISCHARGE BACK.

Fig. 994



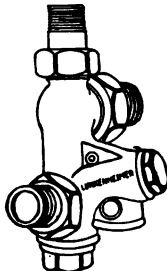
OVERFLOW FRONT.
SUCTION BACK.
DISCHARGE BACK.

Fig. 758



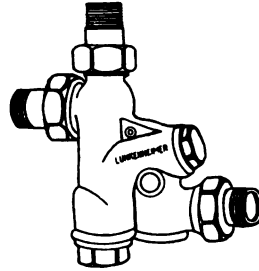
OVERFLOW FRONT.
SUCTION LEFT.
DISCHARGE RIGHT.

Fig. 757



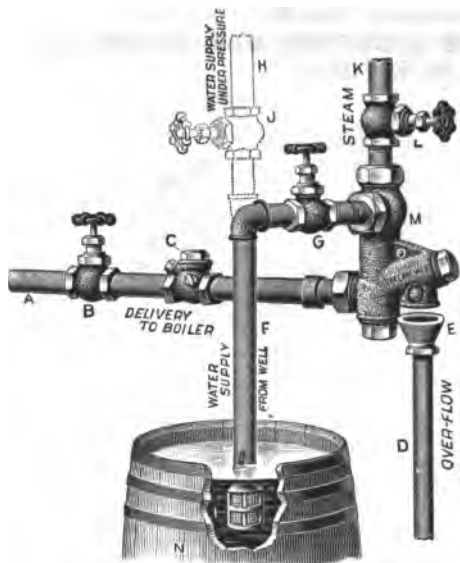
OVERFLOW FRONT.
SUCTION RIGHT.
DISCHARGE LEFT.

Fig. 995



OVERFLOW FRONT.
SUCTION BACK.
DISCHARGE FRONT.

The Lunkenheimer Automatic Injectors are particularly adapted for traction engines, and to suit the connections on the different styles of engines we are prepared to furnish any of the above types. Figure 756 will always be shipped unless otherwise specified.



Lunkenheimer Auto- matic Injector.— Continued.

HOW TO CONNECT.

This cut will give a general idea of how to properly connect a Lunkenheimer Automatic Injector to the boiler. With each machine is sent a complete direction card, which should be read carefully by the user. A new Lunkenheimer Automatic Injector, if properly connected, will show in service all that is claimed for it herein.

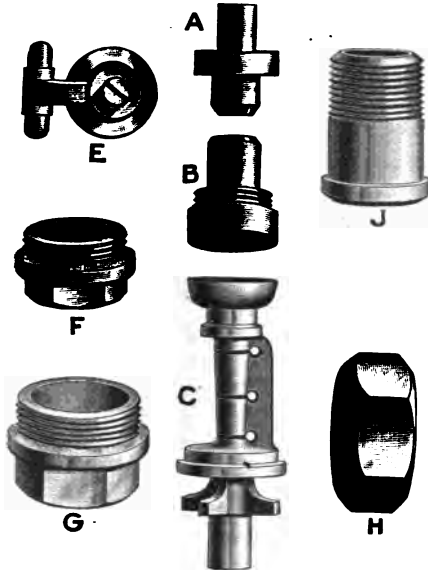
PRICE LIST AND TABLE OF CAPACITIES.

Size No.	All Pipe Connections. Inches.	List Price. Each.	Gallons per Hour. Feed Water, 75°; Lift, 5 ft. Steam Pressures 75, 85 and 95 lbs.				Suitable for Throttling Engine. Horse Power.
			Maximum.			Minimum.	
			75 lbs. Press.	85 lbs. Press.	95 lbs. Press.	95 lbs. Press.	
1	¼	15 00	52	57	60	40	4 to 8
1½	¾	16 00	70	76	80	50	6 to 12
2	½	18 00	117	124	130	65	10 to 15
2½	½	20 00	152	161	170	83	15 to 20
3	¾	25 00	205	217	230	110	20 to 30
3½	¾	30 00	245	275	300	120	30 to 45
4	1	40 00	410	426	450	160	45 to 65
4½	1	45 00	550	580	600	225	65 to 90
5	1¼	55 00	740	750	760	275	90 to 120
6	1½	60 00	920	940	960	450	120 to 140
7	1½	75 00	1300	1320	1350	620	140 to 175
8	1½	90 00	1710	1740	1780	850	175 to 240
9	2	110 00	2265	2290	2340	1050	240 to 300
10	2	125 00	2860	2900	2950	1400	300 to 375

Where injectors are ordered by the size of pipe connections, we always ship the size having largest capacity. The capacities given above are guaranteed to have been taken from actual working tests and are not estimated.

Be sure to specify the type of injector desired. Unless otherwise ordered, we will send the standard form, Fig. 756.

Lunkenheimer Automatic Injectors.—Continued.



REPAIR PARTS
AND WRENCHES.

When ordering repairs for injectors be sure to specify *both size and serial numbers*, otherwise we will have to write for this information. Specify parts required by letter (see chart herewith). Tubes *A, B* and *C* are most liable to wear, and when a "set of tubes" is specified on order, these three will always be sent.

REPAIR LIST.

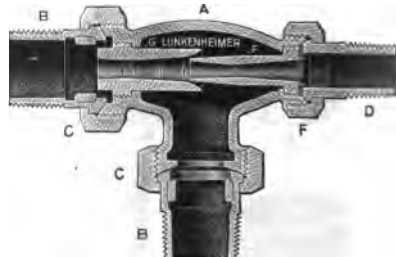
Size Number of Injector,.....	1 & 1½	2 & 2½	3 & 3½	4 & 4½	5 & 6	7	8	9	10
A—Steam Tube, .....each	35	45	55	65	75	85	85	1 00	1 20
B—Water-Lifting or Suction Tube, .....each	35	45	55	65	75	85	85	1 00	1 20
C—Combining and Delivery Tube, .....each	1 50	2 00	2 50	3 00	3 75	4 50	5 50	6 50	8 00
E—Overflow Valve and Pin, ea.	60	75	90	1 05	1 20	1 30	1 45	1 55	1 75
F—Overflow Cap, .....each	40	50	60	70	80	90	90	1 10	1 10
G—Delivery Cap, .....each	80	1 00	1 25	1 50	1 75	2 00	2 00	2 40	2 40
H—Union Ring, .....each	30	40	50	60	1 25	1 50	1 50	1 75	1 75
J—Union Tailpiece, .....each	30	40	50	60	80	1 00	1 00	1 20	1 20
Tube Wrench, .....each	50	50	60	60	70	80	80	95	95

For general dimensions of Automatic Injectors see page 439.

LUNKENHEIMER EJECTOR.



Exterior View.



Interior View.

Fig. 937.

The Lunkenheimer Ejector cannot be surpassed for raising water from deep wells, mines or pits, filling or emptying tanks, raising and transferring liquids (hot or cold) in tanneries, dye houses, etc.

All sizes will lift from 20 to 25 feet, according to the steam pressure used, but where water is to be raised above this height, it is preferable to place the ejector about six feet above the water level and force to the required elevation.

The tubes are made of a very hard grade of bronze and will last indefinitely. They are screwed in the body, and not loosely placed therein and held by the unions only, consequently there is no danger of losing them when removing the unions.

The steam connection is one size smaller pipe than the suction and delivery connections. There is a ground joint between the union and the body, and consequently no trouble need be apprehended because of leaky connections in this respect.

Up to and including size E, which has $1\frac{1}{2}$ -inch suction and delivery connection and $1\frac{1}{4}$ steam, the bodies are made of brass, above which they are made of iron. The unions up to 2-inch pipe inclusive, for steam, suction and delivery connections, are made of brass, above which iron unions are furnished.

The largest size ejector listed herewith is H, which has a capacity of 11,000 gallons per hour. We are prepared to furnish larger sizes if desired. When ordering always state the steam pressure, height of lift and quantity of water to be transferred per hour.

Lunkenheimer Ejectors.—Continued.

DIRECTIONS.

Be sure to have all joints and connections absolutely tight. This is especially necessary with regard to the suction.

It is advisable to use a strainer on the smaller sizes, as this prevents dirt and other foreign matter from clogging up the tubes.

All ejectors will lift from 20 to 25 feet, according to the steam pressure used, the best results being obtained at 50 pounds steam pressure. It is advisable to place the ejector within about six feet from the water and force to the required elevation.

There are no valves required except the one in the steam pipe, which is used for starting purposes, and this may be placed wherever convenient.

TO OPERATE:—Turn on the steam, and, after getting the flow of water established, throttle the steam to as low a degree as the ejector will permit.

PRICE LIST AND TABLE OF CAPACITIES.

Size Letter	PIPE CONNECTIONS.		Capacity—Gallons per Hour. Feed Water 75° Lift 20 Feet. Steam Pressure 50 Pounds.	Price.
	Steam.	Suction and Delivery.		
A	¾ Brass	½ Brass	250	8 00
B	½ "	¾ "	500	10 00
C	¾ "	1 "	960	15 00
D	1 "	1¼ "	1300	20 00
E	1¼ "	1½ "	2000	25 00
F	1½ "	2 "	4000	35 00
G	1½ "	2½ Iron	8000	45 00
H	2 "	3 "	11000	55 00

All genuine Ejectors have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER STRAINERS.



Fig. 917.

Strainers are indispensable to the proper working of small size injectors or ejectors, as they prevent dirt and other foreign substances from clogging up the tubes. They are made of brass and consequently will not rust, and should last for an indefinite period. The mesh of the screen is very fine, but not too small to interfere with the proper supply of water to the injector.

Strainers are sent one size larger than size of injector so as to insure a sufficient supply of water; that is to say, while our Nos. 3 and 3½ injectors have a ¾ inch connection the strainer sent therewith has a 1 inch connection. Reducing bushings are supplied with each strainer.

PRICE LIST.

Size, inches	¾	½	¾	1	1¼	1½	2	2½
Brass, each	60	60	70	90	1 10	1 40	2 00	2 50

LUNKENHEIMER FUNNELS.



Fig. 655.

To prevent the splashing of water about the boiler room from the overflow of an injector, and for a number of other purposes, the above is indispensable. They are finished all over and present an elegant appearance. Can be had with either male or female pipe threads.

PRICE LIST.

Size, inches	¼	¾	½	¾	1	1¼	1½	2
Finished Brass, each	1 20	1 20	1 35	1 50	2 00	2 90	4 00	5 50

SECTION VIII.

MISCELLANEOUS
SPECIALTIES.

LUNKENHEIMER IMPROVED GENERATOR VALVES.

For Gasoline Engines.

(Patent applied for.)



Fig. 997.
Right Hand Pattern.



Fig. 317.
Left Hand Pattern.

In the design of the Lunkenheim Improved Generator Valve we have profited by our past experience and are assured by users that they are far superior to anything ever attempted in this line.

They take the place of carburetters and users have found them, in every respect, more efficient and reliable.

Our improved Generator Valves are made in two forms which we term our right and left hand patterns, and by referring to the illustrations above, the locations of the different connections can be ascertained.

A very desirable feature is the easy regulation of the disc spring H, which can be accomplished without in any way interfering with the operation of the engine and any loss in tension can easily be taken up by means of the adjusting sleeve G. It has been found that gasoline engines work best with generator valve springs set at some particular tension, but as this tension can not be ascertained except by trial when the engine is in operation, it is necessary that provision be made for the easy adjustment of the spring which the Lunkenheim Generator Valve affords.

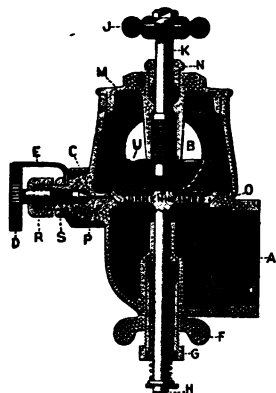
The discs are made very light and strong and the opening in the seat is very large, the area of which is considerably in excess of the area of the inlet. The disc therefore does not have to raise very far off its seat to permit of the required volume of mixture entering the cylinder and the travel of same being but a trifle, the pounding and wear on the seat is reduced to a minimum and the valve is almost noiseless in operation. Should the discs wear, they can easily be reground.

When the generator valve is applied to the crank case of a two-cycle engine, it combines the function of a carburetter and the usual check valve placed between it and the crank case.

Improved Generator Valves.—Continued.

Its operation is dependent upon the alternate periods of pressure and partial vacuum existing in the crank case at different periods of the cycles. When the plunger of the engine moves in on the compression, explosion cycle, the resultant vacuum in the crank case permits the atmospheric pressure to act upon the disc, opening same against the tension of the spring H, the lift being limited by the stem K. At this period, the gasoline port in the side of the valve seat is uncovered and an amount of gasoline is sprayed into the incoming volume of air rushing into the valve and is immediately vaporized or gasified. On the return stroke, the internal pressure within the crank case, assisted by the spring H, causes the disc to seat instantly, thereby retaining the mixture within the engine and shutting off any further injection of gasoline.

The wheel handle of the needle valve is engraved with numbers to show the different degrees of opening and has a flat spot on its periphery, which the spring E engages. The object of this is to enable the operator, after he has properly adjusted the needle valve for the correct mixture, to at any time easily obtain this same adjustment should he close the needle valve or open the same beyond the proper setting. The spring E can be brought to bear on this flat spot, no matter where the same may be, by merely loosening the lock nut S which permits of the free turning of the spring.



Sectional View.

To insure a dependable, even mixture, and consequent regular explosions, we have provided the baffle wall U, located directly in front of the outlet B, against and over which the mixture is drawn, causing the gasoline to so thoroughly mix with the air that when the mixture reaches the cylinder it is positively uniform.

This baffle wall, however, does not in the least obstruct the free passage of mixture, nor does it reduce the area. It also prevents the cylinder from becoming flooded with gasoline, which is often a source of annoyance. None of the parts of the Lunkenheimer Generator Valve are made of iron or steel, which is a desirable feature, as it is well known that iron and steel will quickly corrode when in contact with gasoline.

It is preferable that a strainer be attached to the gasoline pipe to prevent any foreign matter interfering with the proper flow of gasoline. Gasoline should be carefully strained before filling the tank if a strainer is not used.

The lift of the disc is controlled by the stem K, operated by the wheel J, which also controls the speed of the engine.

The following proportions are based on a piston travel of not more than 600 feet per minute. For higher speeds than this, the generator valve should be the next size larger than specified.

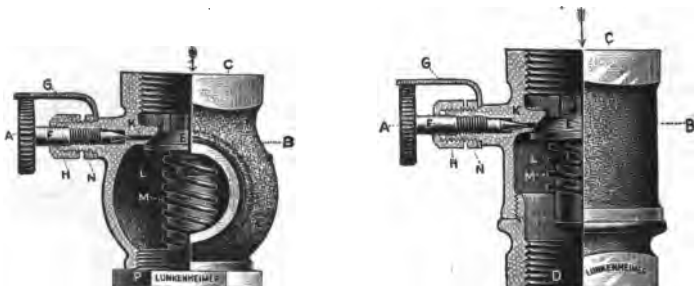
PRICE LIST.

Size,.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Improved Pattern Generator Valve, Right or Left Hand Pattern, .....each	3 40	4 20	5 00	5 90	7 20	9 90
Suitable for Cylinder,.....Diameter, inches	2	3 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	7	8

All genuine Generator Valves have the name LUNKENHEIMER on them.

LUNKENHEIMER PLAIN PATTERN GENERATOR VALVES.

For Gasoline Engines.



Semi-Sectional Views.

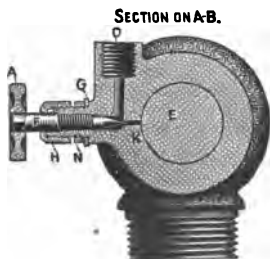


Fig. 779.
Angle Pattern.

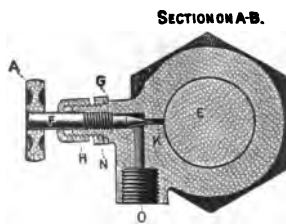


Fig. 780.
Vertical Pattern.

Above are illustrated two forms of our Plain Pattern Generator Valves, and owing to the excellence of design, no liability of their proving troublesome after having been in use a short time need be apprehended. They are lower priced valves than our Improved Pattern, but the same care has been taken in their manufacture as in our other products.

While the above cuts of the angle pattern show only the right hand pattern, we are also prepared to furnish the left hand pattern when so ordered.

The valve is held against its seat by a light spring, and at the side of the valve body is a gasoline inlet tapped for $\frac{1}{8}$ " or $\frac{1}{4}$ " pipe thread, according to size of valve. From this side gasoline inlet, a passageway of ample area leads around and through the valve body and communicates with the main valve seat.

Plain Pattern Generator Valves.—Continued.

The opening of this passageway into the valve seat is controlled by a small needle valve, which has an indicator arm in connection therewith, and the wheel on the end of the valve stem is engraved with numbers to show different degrees of opening. The valve stem has a large stuffing-box, which permits it to be well packed, thereby preventing leakage of gasoline.

The operation of this valve is similar to that of our Improved Pattern, described on pages 274 and 275.

This valve is not intended to take the place of the regular inlet valve on engines of the 4 cycle type. On engines of the 2 cycle type, it takes the place of the usual check valve. It should always be placed as near the crank casing as possible.

Below are listed sizes from $\frac{1}{2}$ to 2 inches, inclusive, but we are also prepared to manufacture any other size that may be required, and will be pleased to quote prices upon application.

PRICE LIST.

Size Pipe Connections, .....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Angle or Vertical Pattern,.....each	2 60	3 30	4 00	4 80	6 00	7 50

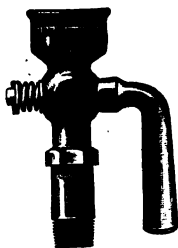
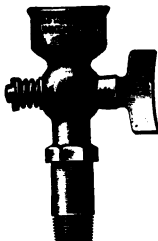
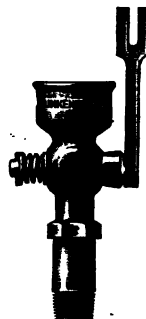
Size of Generator Valve for any Cylinder up to 14 inches Diameter.

Diameter of Cylinder,.....inches	2	3 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	7	8
Size Pipe Connection on Generator Valves, .....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2

The above proportions are based on a piston travel of not more than 600 feet per minute. For higher speeds than this, the Generator Valve should be the next size larger than shown above.

**LUNKENHEIMER
COMBINED PRIMING CUPS AND RELIEF COCKS.**

For Gasoline Engines.

Fig. 820.
Lever Handle.Fig. 821.
Tee Handle.Fig. 367.
L Shank and Lever
Handle. Left Hand Pattern.Fig. 368.
Forked Handle.

These cups serve the purpose of Priming Cups and Relief Cocks, and are indispensable to the easy starting of a gasoline engine. Where it is desired to operate a number of priming cups at the same time (for instance, on automobiles having multiple cylinders), same can be readily accomplished by using our Fig. 368 and connecting the forked levers to a single rod, the manipulation of which either opens or closes all of the cocks simultaneously.

The Elbow Cups can be had either right or left hand pattern, but unless otherwise specified they will be furnished right hand. Modifications of these standard patterns will be made to order at special prices. Submit sketch and state quantity required.

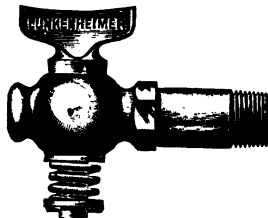
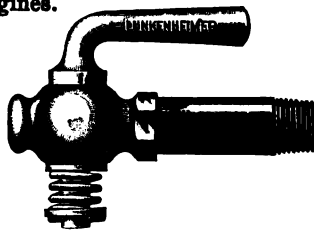
All genuine Cups have the name LUNKENHEIMER stamped on same.

PRICE LIST.

Size..... number	00	0	1	2	3	4
Pipe Size.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$
Fig. 821, with T Handle.....each	70	80	90	1 00	1 30	1 50
Fig. 820, with Lever Handle.....each	75	85	95	1 10	1 40	1 65
Fig. 368, with Forked Lever.....each	95	1 15	1 30	1 50	1 75	2 00
Fig. 367, with L Shank and Lever Handle.....each	85	1 00	1 15	1 35	1 60	1 90

FULL WAY CYLINDER RELIEF COCKS.

For Vapor Engines.

Fig. 982.
Short Shank, Tee Handle.Fig. 313.
Long Shank, Lever Handle.

The above have full opening and make ideal relief cocks for vapor engine cylinders. The keys are ground in the body thoroughly and will not leak, though easily operated.

PRICE LIST.

Size.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Lever Handle, Long Shank.....each	1 30	1 70	2 30	3 40	4 40
Tee Handle, Short Shank.....each	1 10	1 50	2 10	3 20	4 20

LUNKENHEIMER GASOLINE STRAINERS. For Generator Valves.



Fig. 380. Horizontal Gasoline Strainer.



Fig. 347. Angle Gasoline Strainer.

The above are attached to the pipe where most convenient, between the gasoline tank and generator valve. By means of this strainer, any foreign matter that may be in the gasoline will be prevented from entering the valve and obstructing the proper flow. The strainer can be easily removed and cleaned whenever necessary.

PRICE LIST.

Size,.....inches	$\frac{1}{8}$	$\frac{1}{4}$
Generator Valve Horizontal Gasoline Strainers, Fig. 380,.....each	1 30	1 60
Generator Valve Angle Gasoline Strainers, Fig. 347,.....each	1 30	1 60



LUNKENHEIMER GENERATOR VALVE THROTTLE.

Fig. 945.

This valve is placed between the generator valve and the engine and is used for regulating the speed of the engine. While we have found that our device for controlling the lift of the disc is the best method for regulating the supply of mixture to the cylinder, nevertheless the throttle valve alone is preferred by some for this purpose. It is, however, a very valuable addition in connection with our generator valves, Figures 779 and 780, which are constructed without the device for regulating the lift of the disc. The throttle is made of brass, neatly finished, and the disc being balanced will remain at any degree of opening.

PRICE LIST.

Size of Pipe,.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Throttles, .....each	1 90	2 10	2 70	3 30	4 00	5 50

LUNKENHEIMER

AUTOMATIC CYLINDER COCK.

For Slide Valve Engines and Pumps.



Fig. 440.
Exterior.



Sectional View of
Cylinder Cock.

The Lunkenheim Cylinder Cock automatically removes the condensation from cylinders of Slide Valve Engines and Pumps without loss of steam, and is fully warranted to give satisfaction. It consists of two simple winged check valves, B, B, which close alternately against seats A, A; a lever F, which can be turned to hold both valves open; union joints to connect with the drip pipe from both ends of cylinder, also connection to lead the drip away, all arranged in a compact, convenient form.

When steam is admitted to one end of the cylinder, the valve B for that end closes under pressure, and forces open, by means of stem C, the valve for the other end, holding it open for the whole stroke of piston, and allowing the water of condensation to flow out into the drain pipe. This action is reversed when steam enters, the other end of cylinder, and so on, alternately, always leaving the exhaust end of the cylinder open for the escape of water. If desired, both valves can be held open by turning the lever F.

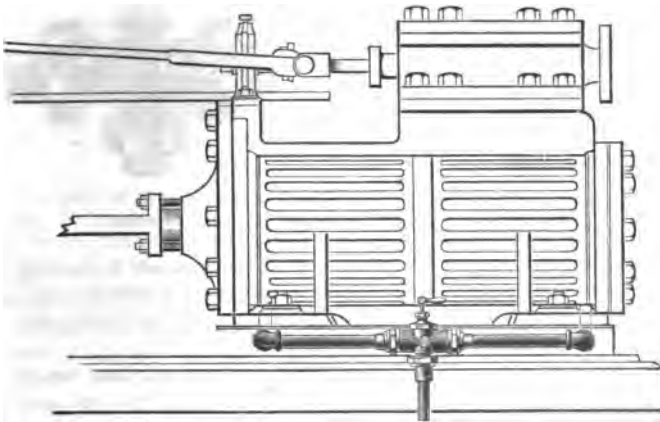
PRICE LIST.

Size, .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$
Adapted to Cylinders,	Up to 6 Inches Diameter	From 6 to 10 Inches	From 10 to 14 Inches	From 14 to 20 Inches	From 20 to 30 Inches	From 30 Inches upward	.....	.....
Brass, each	4 00	7 20	9 00	12 00	18 00	28 00	40 00	56 00

*The above are not intended to be used on cylinders of steam-boat engines.
We make a special cylinder cock for use on steam-boat engines and upon request will send circular fully describing same.*

LUNKENHEIMER
AUTOMATIC CYLINDER COCK.

For Slide Valve Engines and Pumps.

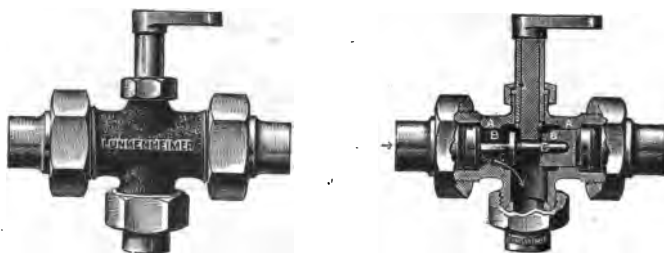


Cylinder Cock as Applied to Cylinder of a Stationary Engine.

SEE DESCRIPTION ON PRECEDING PAGE.

Steamboat Cylinder Cocks constructed on this principle have been furnished by us for the majority of boats on Western Rivers.

LUNKENHEIMER
LOCOMOTIVE PATTERN AUTOMATIC CYLINDER
COCK.



Exterior.

Fig. 905.

Sectional.

We illustrate herewith a sectional view of the Lunkenheimer Locomotive Pattern Automatic Cylinder Cock, which is being quite extensively used on some makes of compound locomotive engines. This cock is very simple in construction and has been giving excellent results.

The device consists of a valve casing (A) containing two wing valves (B) (B) connected together by a loose pin (C). These valves (B) (B) open and close alternately, as steam is admitted and exhausted through the opposite ends of the cylinders to which the inlets of the cock are connected. In this manner they are continually in operation and constantly relieving the cylinder of condensation.

The stem (F) is arranged to be operated by a lever from the cab, so that by turning it to central position both valves (B) (B) are held off their seats and the condensation will drain out of both ends of the cylinder to which the cock is connected.

Prices and dimensions furnished upon application.

LUNKENHEIMER
LOCOMOTIVE CYLINDER COCK.

Rough Brass.



Fig. 778.

The form of Cylinder Cock shown above is intended to be used on locomotive engines. It is a pattern that has been almost universally adopted by the leading railroads in the United States and Canada, and it satisfactorily answers all the requirements of severe service.

These Cylinder Cocks are heavy in pattern, well designed, simple in operation and very durable. They are listed singly, and in ordering please bear in mind that a "pair" will be understood to comprise two, and a "set" four cocks. When ordering, always specify what thread is required on the shanks, otherwise they will be sent blank, as per the dimensions given below.

PRICE LIST.

Each,	3 80
Diameter of Blank Shank at small end, .....inch	1
Diameter of Blank Shank at shoulder, .....inches	1 $\frac{3}{8}$
Dimensions of Slot for Rod,.....inch	$\frac{1}{8}$ x 1
Length over all, .....inches	7 $\frac{3}{4}$
Distance End of Shank to Center of Slot,.....inches	6 $\frac{1}{2}$

LUNKENHEIMER INDICATOR COCKS. For Engine Cylinders.



Fig. 439.
Three-Way.

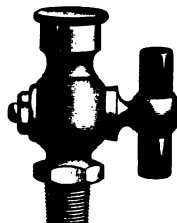


Fig. 544.
Straight-Way.

These Cocks are perfect in every way and are so designed as to give an unobstructed flow of steam. They are heavy, well finished and guaranteed to give satisfaction. The Three Way Pattern can be made with female union at each end instead of one expansion coupling, or with both ends plain female threads, without extra charge. Unless otherwise specified, orders for indicator cocks will be filled with Fig. 439, having connection for Thompson Indicator Gauge. We will furnish Indicator cocks to fit any other gauge without extra charge when so ordered.

PRICE LIST.

Size,	inch	$\frac{1}{2}$	$\frac{3}{4}$
Three Way, Finished Brass,.....	each	10 00	15 00
Three Way, Nickel Plated,.....	each	12 00	18 00
Straight Way, Finished Brass,.....	each	4 00	6 00
Straight Way, Nickel Plated,.....	each	5 00	7 50

LUNKENHEIMER MARINE PATTERN THREE WAY INDICATOR COCKS.



Fig. 801. Marine Pattern.

The LUNKENHEIMER Marine Three-Way Indicator Cocks are substantially constructed and are designed for vertical engines. The material is of the highest grade of bronze composition and the workmanship is perfect. The key is ground in the body and a perfect bearing is assured.

PRICE LIST.

Size,	inches	$\frac{1}{2}$	$\frac{3}{4}$	1
Finished Brass,	each	13 00	16 00	19 00

LUNKENHEIMER
COMPLETE INDICATOR ATTACHMENT WITH
RELIEF AND CORNER VALVES.

For Engine Cylinders.

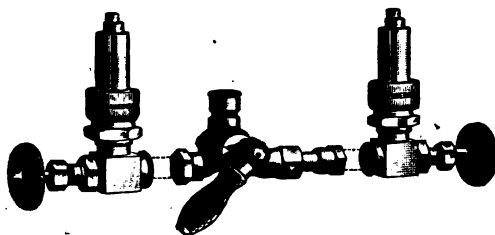


Fig. 657.

The above displays a most desirable, and in fact, necessary adjunct to properly equip the cylinder of an engine. We have in a convenient, handsome and compact form the Cock to which to attach the Indicator Relief Valves to discharge accumulations of condensed water and prevent cracked and bursted cylinders, and well made Corner Valves to shut off connection from Cylinder to Indicator Cock, all combined on suitable brass pipe connections. We have sold a great number of these sets and they have given satisfaction to all users and are reliable in every way. When ordering always give exact distance from center to center of holes in cylinder, also length and size of short nipples to connect into same. While our cut shows Relief Valves with Top Outlet, we can, when so ordered, furnish Angle Outlet without extra charge. Top Outlet Valves will always be sent unless otherwise specified.

PRICE LIST.

Size, .....inches	½	¾	1	1¼	1½	2	2½	3
Complete, Finished Brass,.....each	32 00	34 00	37 00	40 00	45 00	60 00	84 00	100 00
Complete, Nickel Plated,.....each	36 00	38 00	42 00	46 00	53 00	70 00	94 00	110 00
Without Relief Valves, Finished Brass,.....each	23 00	24 00	25 00	25 60	27 00	34 00	42 00	50 00
Without Relief Valves, Nickel Plated,.....each	25 60	26 40	28 00	29 00	32 00	40 00	47 00	58 00

LUNKENHEIMER EXPANSION JOINT.



Fig. 571.

Our Expansion Joints are practical, strong and durable. By means of the stuffing-box, they are made absolutely tight, and no trouble need be apprehended in this particular.

The pipe threads are full and perfect, and the general workmanship is beyond criticism. The Joints are made of the highest grades of bronze composition and are thoroughly inspected and tested before leaving the factory.

PRICE LIST.

SIZE, .....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
Brass, Screw Ends,.....each	1 50	2 20	2 75	4 00	5 00	8 00	17 50	24 00	.....	.....
Iron Body, Brass Sleeve, } Screw Ends, .....each }	.....	.....	.....	.....	.....	7 00	8 00	10 00	14 00	18 00
Iron Body, Brass Sleeve, } Flange Ends, .....each }	.....	.....	.....	.....	.....	15 00	16 00	18 50	25 00	30 00

LUNKENHEIMER CORNER VALVES AND ELL FITTINGS. For Engine Cylinders.



Fig. 659. Corner Valve.



Fig. 660. Corner Ell.

These are intended to be used in connection with Relief Valves and Indicator Cocks in making attachments to cylinders. They are heavy in pattern, carefully designed and substantially constructed in every way, and our pipe thread connections are at perfect right angles, a necessity very frequently overlooked by other manufacturers.

PRICE LIST.

Size, inches,	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Corner Valve, Finished Brass,.....each	3 50	4 00	4 50	4 80	5 00	7 00	9 50	12 50
Corner Valve, Nickel Plated,.....each	3 80	4 30	4 90	5 30	5 50	7 50	10 20	13 50
Corner Ell Fitting, Finished Brass,.....each	2 70	3 00	3 30	3 70	4 20	5 00	6 40	8 70
Corner Ell Fitting, Nickel Plated,.....each	2 90	3 20	3 60	4 10	4 60	5 40	7 00	9 40

**LUNKENHEIMER
SWIVEL COUPLINGS.**

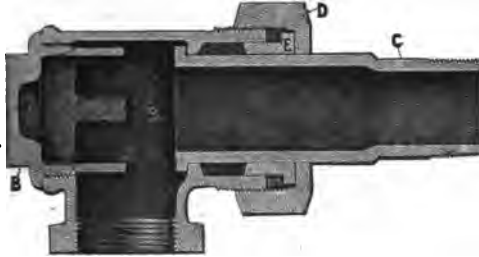


Fig. 914.

The illustration herewith shows a form of swivel coupling which was primarily designed for the piping of steam presses. It has answered so satisfactorily for that purpose that it has been adopted by a number of manufacturers of rubber goods and also in paper mills.

The construction consists of a casing (A) holding swivel tailpiece (C), which can be removed through opening in casing closed by plug (B). The tailpiece (C) is free to rotate and also has some lateral motion. The packing recess is amply large to hold plenty of packing, which effectually prevents leakage.

All parts are heavily and substantially constructed of the best bronze composition, and users will find it the most durable joint of the kind on the market.

An extra charge will be made for couplings differing in dimensions from those specified below. We are prepared to make joints with special long tailpieces, the charge being based upon the variation from our standard lengths.

PRICE LIST.

Size,	inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2
Rough Brass,	each	3 00	3 80	5 80	7 00	8 00	10 50
Finished Brass,	each	3 90	4 50	7 00	8 50	9 60	12 50
Distance Center of Inlet to End of C,	inches	4 $\frac{1}{2}$	5 $\frac{1}{4}$	5 $\frac{3}{4}$	6	6 $\frac{1}{2}$	7
Lateral Movement of C,	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{11}{16}$	$\frac{1}{2}$	$\frac{11}{16}$	1 $\frac{1}{8}$



Fig. 614.

LUNKENHEIMER

BRASS SWING JOINTS.

PRICE LIST.

Size,	inches	$\frac{1}{4} \times \frac{1}{4}$	$\frac{3}{8} \times \frac{3}{8}$	$\frac{1}{2} \times \frac{1}{2}$	$\frac{3}{4} \times \frac{3}{4}$	1 x 1	1 $\frac{1}{4}$ x 1 $\frac{1}{4}$	1 $\frac{1}{2}$ x 1 $\frac{1}{2}$	2 x 2
Rough Brass,	each	1 90	2 20	2 50	3 50	5 00	6 50	9 00	13 00
Finished Brass,	each	2 30	2 70	3 00	4 00	5 75	7 25	10 00	15 00

**LUNKENHEIMER
FILTER PRESS COCK.**

BRASS.



Fig. 214.
Low Lever.



Fig. 213.
High Lever.

The above are guaranteed to be perfectly tight and are very durable. The keys are carefully ground in the bodies and the cocks are well made in every respect.

They can be had with either high or low levers, which are used alternately when a number of the cocks are placed in a row and close together, thereby permitting the high levers to pass over the low ones.

When ordering be sure to specify whether wanted with high or low levers. Prices on application.

**LUNKENHEIMER
ADJUSTABLE SPANNER WRENCH.**



Fig. 654.

These Wrenches are strong, well made and designed for use on our valves with Slotted Bonnet Rings, also for unions and other screw rings having slots in their periphery. They are made in three sizes, as listed below, and are comprehensive in the scope of their adjustment.

PRICE LIST.

Number,.....	1	2	3
For Valve Sizes,.....inches	1 and below	1½ to 2.	2½ up
Malleable Iron,.....each	1 50	2 00	2 50

LUNKENHEIMER RADIATOR AIR VALVES.



Fig. 548.
Wood Handle,
Ball and Tip.



Fig. 549.
Loose Key
with Tip.



Fig. 550.
Plain with
Loose Key.



Fig. 551.
Plain.

PRICE LIST.

Finish.....	Brass.		Nickel Plated.	
Size, .....inch	1/8	1/4	3/8	1/2
Fig. 548, Wood Handle, Ball and Tip,.....each	65	70	70	75
Fig. 549, Loose Key with Tip, .....each	50	55	55	60
Fig. 550, Plain, with Loose Key, .....each	30	35	35	40
Fig. 551, Plain,.....each	30	35	35	40
Extra Keys for Fig. 549 and Fig. 550,.....each	12	12	18	18

LUNKENHEIMER BRASS BALLS.

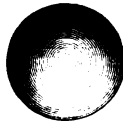


Fig. 417.
Brass Ball.

We have had long experience in making Brass Balls by special tools of our own invention, and can guarantee those made by us to be absolutely spherical. Sizes above 1 1/2 in. diameter are cast hollow.

PRICE LIST.

Diameter,.....inches	3/8	1/2	3/4	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3
Price, .....each	20	30	55	70	90	1 25	2 10	2 60	3 30	4 70	5 30	6 10

Diameter,.....inches	3 1/4	3 1/2	3 3/4	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8
Price, .....each	7 00	8 00	9 00	10 50	12 50	14 00	17 50	21 50	28 00	46 00	50 00	55 00

LUNKENHEIMER STEEL SEAT REAMERS.

For Regrinding Valves.



Handle for Steel Seat Reamer for Valves 1 in. and above.



Section of Valve showing Reamer in position to cut a new Seat Bearing.



Fig. 560.
Steel Seat Reamer for Valves below 1 inch size.

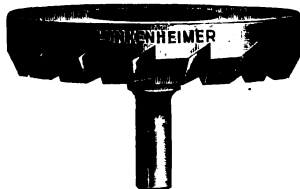


Fig. 559.
Steel Seat Reamer for Valves 1 inch and above.

While it is usually very easy to regrind our valves when worn, still, in some cases, where subjected to very hard service, they sometimes become so badly cut or worn in the seat that the usual process of regrinding would be difficult. In such instances we recommend the use of our steel seat reamers, which are very easily and quickly applied without removing valve body from pipe. On sizes of valves $\frac{1}{4}$ to $\frac{3}{4}$ inches inclusive the reamers are made with guide and T-handle so that the trimming of the valve can be removed and the reamer inserted in place. On the other sizes the loose valve disc can be removed and the reamer screwed on in place, and, as the hub guides in the body while the new seat bearing is being cut, it is always sure to be in line with the stem, which is quite an advantage over other reseating devices. A set of these reamers can be obtained at a small cost, and are practically indestructible, as they can be sharpened any number of times without changing their form. Care should be taken in reseating valves not to take a larger cut than is only necessary to form a new bearing. In case the brass discs or stems should wear out, these can be renewed at a small cost.

See page 37 for list of repair parts.

PRICE LIST.

Size,	inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
Steel Seat Reamers,	each	3 70	4 20	4 35	4 50	5 00	5 00	5 70	6 40	7 50	10 00	11 70

SECTION IX

CYLINDER LUBRICATORS.

LUNKENHEIMER

IMPROVED "SENIOR" SIGHT-FEED LUBRICATOR.

Double Connection.



Fig. 482. "Senior."

DESCRIPTION.

- | | |
|---|--|
| B—Oil Reservoir. | K—Discharge Valve. |
| C—Upper Valve. | L—Valve for regulating flow of oil. |
| E—Filling Plug. | N—Indicator Glass. |
| F—Drain Valve. | P—Sight-Feed Glass. |
| H—Union to connect Condenser
Pipe and Valve. | J—Valve to drain or blow out Sight-
feed Glass P. |

This lubricator has special features and advantages not found in other makes. We have dispensed with the use of a condensing chamber or bulb owing to its liability to freeze and consequent bursting, the filling plug has been placed directly on top of the oil reservoir or chamber, which makes the cup easy to fill. The sight-feed and indicator glasses, when broken, can easily be replaced by removing plugs S, and the sight-feed is provided with a vent plug, by means of which steam can be blown through the glass to clean it. The connection shanks on the $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{4}$ pint sizes are threaded for $\frac{3}{8}$ inch pipe instead of $\frac{1}{2}$ inch, consequently, these sizes of cups can be attached to small steam pipes.

These advantages, combined with neat design, superior workmanship and finish, make the "Senior" the most modern and efficient sight-feed lubricator on the market. Every cup is tested and warranted.

DIRECTIONS FOR CONNECTING AND OPERATING THE "SENIOR."

Drill and tap Steam Pipe above the Throttle Valve to receive Oil Discharge Shank, and higher up for $\frac{1}{4}$ inch pipe thread for Condenser Pipe and Angle Valve.

To operate, close valves C, L and K.

Drain the Lubricator by opening valve F. Close Valve F and fill (FULL) with oil at E.

After filling, open valve K (SLOWLY), and wait until Sight-Feed Glass P has filled with water by condensation, then open valve C and regulate the oil drops with valve L.

After the first filling with oil, valve K need not be closed; as long as glass tube P is full of clear water it is only necessary to close valves C and L to refill.

The bottom Sight-Feed Glass fitting is provided with a Drain Valve for blowing out or draining Sight-Feed Glass.

Indicator Glass N shows the quantity of oil in the Oil Reservoir.

If Indicator Glass N, or Sight-Feed Glass P, break, they can be replaced by unscrewing Plugs S and slipping glasses through from the opening. This feature in construction of the Lubricator also facilitates cleansing the glasses.

All Lubricators are neatly packed in wooden boxes with sliding lids.

PRICE LIST.

Size,	$\frac{1}{4}$ Pt	$\frac{1}{2}$ Pt	$\frac{3}{4}$ Pt	1 Pt	1 $\frac{1}{2}$ Pt	1 Qt	$\frac{1}{2}$ Gal	1 Gal
Suitable for Engine Cylinders,.....	Up to 4 inches	4 to 6 inches	6 to 10 inches	10 to 14 inches	14 to 18 inches	18 to 24 inches	24 to 30 inches	From 30 up
Shanks, pipe thread,.....Inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Finished Brass,.....each	12 00	15 00	17 00	20 00	22 00	25 00	28 00	38 00 60 00
Nickel Plated,.....each	13 50	17 00	19 00	22 50	25 00	28 50	32 00	43 00 65 00
Condenser Connections, Brass Tubing and Angle Valve,.....each }	60	70	80	1 00	1 20	1 40	1 50	1 60 1 70
Condenser Connections, Brass Tubing and Angle Valve, Nickel Plated,.....each }	70	80	90	1 15	1 40	1 60	1 70	1 80 2 00
Length of Condenser Pipes nec- essary,.....Inches }	15	18	24	30	36	42	48	60 72

Lubricators are sent without Condenser Pipes and Angle Valves unless otherwise ordered.

All genuine Lubricators have the name LUNKENHEIMER stamped on same.

See pages 296 and 297 for price list of repairs.

LUNKENHEIMER

**"JUNIOR" SINGLE CONNECTION SIGHT-FEED
LUBRICATOR.**

For Traction Engines, Steam and Air Brake Pumps, Etc.



Fig. 486. "Junior."

DESCRIPTION.

A—Oil Reservoir.
B—Condensing Chamber.
C—Steam Valve.
D—Filling Plug.
E—Drain Valve.
F—Oil Regulating Valve.

H—Valve for draining Sight-Feed Glass.
J—Sight-Feed Glass.
K—Union Nut on Condensing Chamber.
N—Union for Pipe Connection.
S—Plug to replace or cleanse Glass.
X—Bent Condenser Pipe.

LUNKENHEIMER "JUNIOR" LUBRICATOR.

The "Junior" has been designed to meet the demand for a SIMPLE, RELIABLE and INEXPENSIVE Single Connection Sight-feed Lubricator for Small Engines, Portables, Steam Pumps and Locomotive Air Brakes. It has but two valves—Steam Valve C and Oil Regulating Valve F. The sight-feed principle is that of "oil drops passing up through water in a glass tube." It is of neat design and very ornamental.

The "Junior" can be attached to steam pipe or chest, and if to steam pipe preferably on boiler side of throttle. If placed on steam-chest attach it into top of same by using a short piece of vertical pipe and elbow. The working of the cup is not affected by turning steam on or off. In attaching, see that hole in steam pipe is tapped straight, allowing shank to stand exactly horizontal.

Use good cylinder oil and feed about four drops per minute. To cleanse glass tube remove plug S, using cotton waste on a piece of wood (not iron wire). To prevent freezing, the cup can be drained by closing valve C and opening Drain Valve E. Keep stuffing-boxes tight, as leakage prevents perfect working of cup.

The "Junior" is the only single connection sight-feed lubricator thus far placed on the market giving satisfaction, and is covered by patents. Many thousands are in use, and infringements and imitations are offered. We warn users against these; insist on getting the genuine; they cost no more. Every cup is plainly marked with "Junior," our name and patent stamp.

TO FILL AND OPERATE.

Close Valves C and F, drain cup at E, and fill (FULL) with oil. THEN OPEN VALVE C SLOWLY. When glass tube has filled with water regulate oil drops at F.

While cup is working leave Steam Valve C WIDE OPEN, unless pulsation interferes with oil drops, in which case regulate to suit. Valve H should only be opened when it becomes necessary to blow out or drain sight-feed glass.

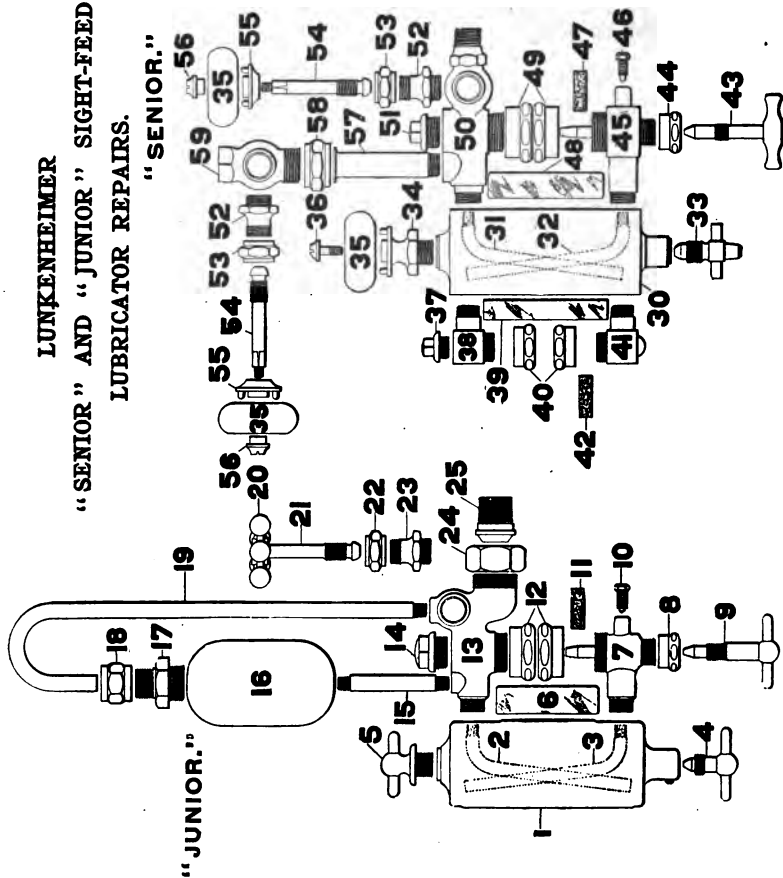
All Lubricators are neatly packed in wooden boxes with sliding lids.

PRICE LIST.

Size, .....pint	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{2}$
Shank, Pipe Thread, .....inch	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
Partly Finished, Fig. 486,..... each	7 00	8 00	10 00
All Finished (Brass Condensers and Pipes, and Wood Handles), Fig. 270,.....each	8 50	10 00	12 00
All Finished and Nickel Plated (Brass Condensers and Pipes, and Wood Handles), .....each	10 00	11 50	13 50

$\frac{1}{4}$ and $\frac{1}{3}$ Pint sizes are also made with $\frac{1}{2}$ inch pipe shank, but will be sent as above ($\frac{3}{8}$ inch) unless otherwise specified. These Lubricators can also be furnished with glass gauge, to indicate quantity of oil in reservoir, at an extra charge of 50 cents each net, but will be sent without, unless specially ordered. Where sizes larger than $\frac{1}{2}$ pint are wanted, we recommend our "Senior," pages 292 and 293. See pages 296 and 297 for price list of repairs.

LUNKENHEIMER
"SENIOR" AND "JUNIOR" SIGHT-FEED
LUBRICATOR REPAIRS.



See page 297 for list prices of Lubricator repair parts.

Junior Lubricator.

Senior Lubricator.

[illegible]

LUNKENHEIMER DOUBLE SIGHT-FEED LUBRICATOR. For Compound Engines.

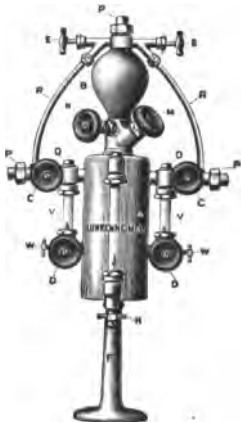


Fig. 484.
Double Sight-Feed Lubricator with Stand.

This Lubricator is designed for use on Compound Engines and is fully warranted to fulfill the requirements of such service, and special attention is called to its simplicity of construction and neat design. It is provided with equalizing tubes, thus variations in pressure are properly equalized, preventing "syphoning" of the oil, and it has many other important features exclusive with this lubricator. Owing to the variety of methods employed in connecting lubricators of this kind, we can furnish them made in several styles, viz.: with brace-stud and locknut at back or bottom, and with vertical or horizontal stand. In ordering always specify which style of support is desired and if wanted with stand give height and base diameter of same. Cups furnished with stands are charged at a slightly higher price than those with brace studs. When necessary we can furnish lubricators with any number of sight-feeds. Prices on these special cups will be quoted upon application.

DIRECTIONS.

Attach the cup securely to the engine in whatever manner most convenient and accessible. Then connect top live steam connection to steam pipe above lubricator, and oil discharge ends to tubes connecting with center of steam chests of cylinders.

To operate, close water and oil discharge valves and fill reservoir with oil, open oil discharge valves and allow sight-feed glasses to fill with water, then open water valve and regulate feed of oil with oil regulating valves. Before refilling drain water from cup by means of drain valve at bottom of reservoir. In some cases it may be necessary to regulate oil discharge valves to insure cup working to best advantage. Broken glasses can be easily replaced by taking off plugs o.

PRICE LIST.

Size	1 Pint.	1½ Pint.	1 Quart.	½ Gal.	1 Gal.
Nickel Plated without Stand,.....each	36 00	42 00	48 00	60 00	80 00

On all sizes of cups, the Unions at top of Condenser Connection and on Oil Delivery Connections have ¾ inch female pipe thread.

LUNKENHEIMER

"INDEPENDENT" SIGHT-FEEDS.

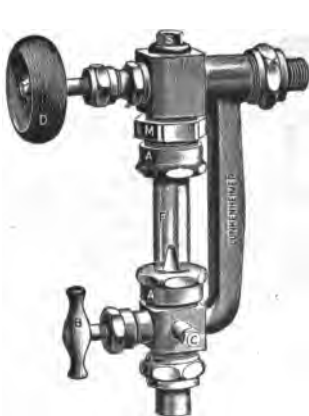


Fig. 494.
Plain.



Fig. 683.
With Equalizing Attachment.

Lunkenheimer "Independent" Sight-Feeds are intended to be used in connection with closed pressure tank systems for the purpose of supplying oil to steam chests and cylinders of steam engines. This method of lubrication is often used where a number of engines are in close proximity to each other, and the oil for all is supplied from a centrally located tank under pressure.

The Plain device, Fig. 494, is intended for use on simple engines, and should be connected above the throttle valve of same.

The device with Equalizing Attachment, Fig. 683, can be attached on the steam chests of simple or compound engines. The steam pressure on it can be equalized and oil prevented from being syphoned by connecting an $\frac{1}{4}$ inch pipe from boiler side of throttle valve and attaching it to the small union E at top of discharge shank of sight-feed. The equalizing pipe should have a valve in it so as to shut off steam after engine throttle is closed.

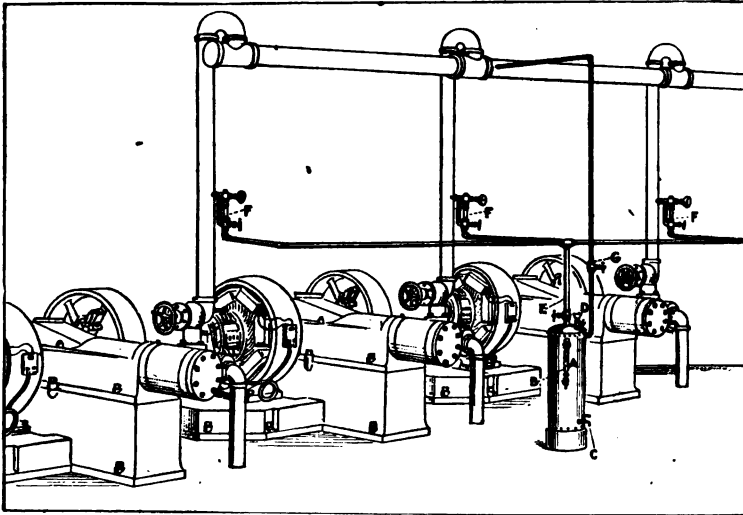
Should a sight-feed glass become broken it can easily be replaced without taking off valve D, by simply unscrewing stuffing-boxes AA, and then the bushing M, when the broken glass can be slipped out and a new one put in place.

These devices are heavy and substantial in construction, and have unions for both oil pipe and engine connections. Shank threaded for $\frac{3}{8}$ inch pipe and oil connections for $\frac{1}{4}$ inch pipe. Estimates and general information regarding oiling systems furnished upon request. In writing send sketch of engine room showing location of engines.

PRICE LIST.

Plain, Brass.....	each	6 00
Plain Nickel Plated.....	each	7 00
With Equalizing Attachment, Brass.....	each	6 50
With Equalizing Attachment, Nickel Plated.....	each	7 50

LUNKENHEIMER
OILING SYSTEM.



The illustration above shows a conventional method of attaching the "Independent" sight feeds illustrated and listed on page 300. This system of lubrication comprises a centrally located tank of large size to hold the cylinder oil, from which can be led off any number of pipes to the engines. We make these tanks in all capacities from five to sixty gallons.

This system of lubrication is very economical, for the reason that no oil is wasted, as is the case in filling a number of small independent lubricators; and, if properly arranged, and sufficient hydrostatic pressure is placed on the tank, the oil can be fed with great regularity.

While the illustration shows simply a conventional form of attachment, this system can be adapted in a number of ways, so that the tank can be located in any part of the engine room most convenient.

We are prepared to make estimates on complete installations, and would be glad to submit drawings and prices upon receipt of specifications. In writing be sure to specify size of tank required, number of outlets from same, and also whether the sight feeds are wanted with or without equalizing attachment. We prefer, if possible, to have a sketch of the engine room, showing the location of engines and pumps. We have installed a great many of these systems, and can guarantee satisfactory results.

LUNKENHEIMER AUTOMATIC SIGHT-FEED "GRAPHITE" LUBRICATOR.

For Cylinders of Steam Engines and Pumps.

The tendency of the present period among steam users generally, is toward higher pressures and often superheated steam, and the use of oil as a lubricant is not entirely satisfactory in all cases.

Flaked graphite has long been known as a superior lubricant, having the peculiar quality of being adapted to be forced into the superficies of the cylinders and valves of steam pumps and engines, due to the motion of the moving parts, giving them a highly finished surface, thus reducing the friction and requiring very little oil. While graphite possesses high lubricating qualities, it is not advisable to use it alone, and we therefore deem it a good practice to use in connection with the "Graphite" Lubricator either an Oil Pump or Sight-Feed Lubricator. When this combination is effected, it is only necessary to feed about one-third as much oil as when no graphite is used. Another valuable feature of graphite is that it fills up the crevices and interstices of the packings, thus the stuffing-boxes need not be kept so tight and the friction on the rods and valve stems is lessened, and it also increases considerably the durability of the packings. While many engineers would use graphite they have found considerable difficulty in procuring suitable apparatus for feeding it to the parts to be lubricated.



Fig. 490.

We now present to our engineering friends our Single Connection "Graphite" Sight-Feed Lubricator, and can confidently guarantee it to be perfect in every particular, and suitable for the purpose its name implies. The graphite is fed automatically and continuously in desired quantities, and visibly by passing it through a sight-feed. The cup requires but one connection to the cylinder, is very simple in construction, compact and ornamental in appearance.

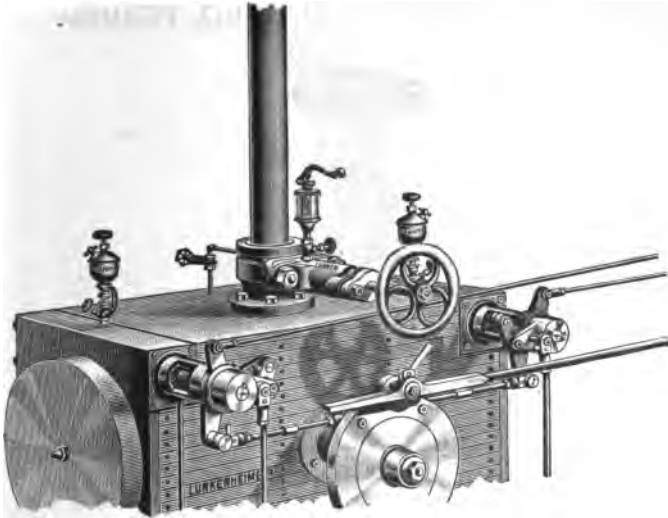
THE LUNKENHEIMER PATENTED SIGHT-FEED "GRAPHITE" LUBRICATOR should always be placed on the steam chest. On slide valve engines it is only necessary to use one cup, placing it about the middle of the steam chest, but on Corliss engines it is best to use two, placing one over each valve, as shown in cut on opposite page.

DIRECTIONS FOR OPERATING.

Close steam valve and open drain plug to allow steam to escape from cup; then close regulating valve, remove filling plug and fill cup with graphite. After replacing filling plug close drain plug, open steam valve (wide) and regulate feed of graphite by regulating valve. The sight-feed glass can easily be cleaned by opening drain plug. If necessary to replace the sight-feed glass take cup apart by means of locknut, and slide the new glass down through the opening.

As graphite is a very superior lubricant, and a small quantity will last quite a while, it is recommended to be used very economically, as a continuous feeding of same is not necessary; thus the feed can occasionally be shut off. To insure best results, we would recommend the use of our superior Graphite, which is put up in five-pound packages and is reasonable in price.

Automatic Sight-Feed "Graphite" Lubricators.—Continued.



Cut showing Corliss Engine with "Graphite" Lubricators placed over Valves on Steam Chest. Glass Body Oil Pump applied, and the "Lunkenheimer" Throttle Valve with Automatic Interior By-Pass and Renewable Seat used as a Throttle.

PRICE LIST.

Number,.....	1	2	3
Capacity (Graphite),.....ounces	3	5	8
Shank Pipe Thread, .....inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Finished Brass,.....each	10 00	12 00	16 00
Finished Brass, Nickel Plated, .....each	11 00	14 00	18 00
Five-Pound Cans of Superior Graphite,.....per can	2 45		

LUNKENHEIMER

AUTOMATIC NEEDLE VALVE OIL FEEDER.



Fig. 496.

The Lunkenheim Automatic Needle Valve Oil Feeder is intended for SLIDE VALVE Engines only, works automatically by pulsation, and must be placed on the steam chest. The stop valve must always be left open except when filling cup with oil. Do not drain off the water until ready to recharge the cup. The Lubricator stops feeding when the engine stops, and is about properly adjusted as shipped. To regulate the feed, screw yoke up or down, thereby increasing or decreasing the lift of needle. The greater the lift of the needle the more oil is fed; the needle works up and down like a check valve while the engine is in motion.

PRICE LIST.

Diameter,.....inches	1½	2	2½	3
Capacity, .....plnt	¾	¾	¾	1
Shank Pipe Thread,.....inch	¾	¾	¾	¾
Plain Top, Fig. 496,.....each	4 70	6 20	7 70	9 00

A card with full directions for using Oil Feeder is attached to every cup.

LUNKENHEIMER
OIL FEEDER WITH COCK AND TUBE.



Fig. 497.

Our new style Plain Engine Lubricator with Cock and Tube is constructed on the same general principles as the old style, but will be found superior in design and efficiency. The Cup is heavier, stronger and better proportioned, and instead of an ordinary air cock screwed into the side of the oil chamber, it has a well made drain valve with drip nozzle, which is not liable to leak; it is located opposite the steam valve instead of on the oil chamber. As is well known, cups of this character work automatically by condensation, and although the flow of oil from the cup cannot be accurately regulated, still the feed is continuous and requires refilling but once per day. It is far superior to a common plain engine lubricator. Where a strong and simple automatic lubricator, without sight-feed is wanted, we recommend this cup. It will be found very convenient for small engines and steam pumps and should be placed on steam chest.

PRICE LIST.

Number,.....	7	8	9	10
Diameter,.....inches	1½	2	2½	3
Capacity, pint	¾	¾	¾	1
Shank Pipe Thread,.....inch	¾	½	½	¾
Finished Brass,.....each	3 00	4 50	6 00	7 50

LUNKENHEIMER PLAIN ENGINE LUBRICATOR.



Fig. 498.

Although a plain lubricator, as its name implies, there is nevertheless quite a demand for this design. It has but few parts and can not get out of order. There are quite a number of different makes of this style of lubricator on the market, but none of them possess the strength or durability of the Lunkenger make. It is very heavy and is made in two parts, the shank being screwed into the cup, which is very desirable when subjected to rough usage, for should either the shank or cup become damaged, only that part need be replaced, thereby saving the expense of an entire new cup.

The valve in the shank makes it possible to fill the cup while the engine is running, by simply closing same, and it also acts as a feed regulator.

Unless otherwise specified, the filling plug at the top is provided with a wood wheel, but it can be had with an iron wheel if desired without extra charge.

PRICE LIST.

Number,.....	00	0	1	2	3	4	5	6	7	8
Diameter,.....inches	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	3	3 1/2	4
Capacity,.....ounces	3/4	1	1 1/4	1 1/2	2 1/2	4	5	10	18	24
Pipe Thread,.....inch	3/8	3/8	3/8	1/2	1/2	1/2	1/2	3/4	3/4	3/4
Plain, Fig. 498, .....each	2 00	2 20	2 40	2 60	2 90	3 25	3 75	4 75	7 00	10 00
Plain with Cock and Tube, Fig. 307,.....each	3 00	3 20	3 40	3 60	3 90	4 25	4 75	5 75	8 00	11 00

LUNKENHEIMER MULTIPLE OILER.

Pressure Type.

For Gas, Gasoline or Oil Engine Cylinder and Bearing Lubrication.



Fig. 939.

Illustrated above is our standard Multiple Oiler as designed for the lubrication of cylinders and bearings of vapor engines. The sight-feeds for the cylinders are provided with check valves and baffle caps to prevent the back pressure from escaping into the sight-feed chambers and interfering with the proper formation of the drops. With these improved, patented features and by providing a large and free passage through the outlet connection, the drops are perfectly formed, drop freely and steadily, and the sight-feed chambers never fill up, thus insuring a constant, even flow of oil to the cylinders.

The glasses in the sight-feeds are very strong and heavy, and it is seldom, if ever, that they have to be renewed. The reservoirs are provided with extra large filling holes and heavy glass ends.

These oiling devices are extensively used on Marine Gas Engines, and can be had with any number of sight-feeds or any capacity of oil reservoir. When ordering always give the capacity of the reservoir desired and the number of feeds. If possible, send a sketch showing the number and relative positions of the pressure and gravity feeds. All the feeds can be made for pressure if desired.

PRICE LIST.

Capacity.....	1 Pt.	1 Qt.	½ Gal.	1 Gal.	2 Gal.	3 Gal.
Reservoir, Finished Brass.....each	8 40	11 60	15 00	20 00	26 60	36 60
Reservoir, Nickel Plated.....each	9 70	13 70	17 30	22 60	29 70	40 00
Pressure Type Sight Feed.....each	2 70	2 80	3 00	3 10	3 20	3 40
Pressure Type Sight Feed, Finished Brass.....each	3 10	3 20	3 40	3 50	3 60	3 80
Gravity Type Sight Feed, Nickel Plated.....each	1 35	1 40	1 50	1 55	1 60	1 70
Gravity Type Sight Feed, Finished Brass.....each	1 55	1 60	1 70	1 75	1 80	1 90
Band Brackets, Finished Brass.....each	3 40	4 20	4 50	5 30	6 00	7 10
Band Brackets, Nickel Plated.....per pair	3 60	4 50	4 80	5 60	6 50	7 60
Header Brackets, Finished Brass.....per pair	3 10	3 70	3 80	5 00	6 00	6 70
Header Brackets, Nickel Plated.....per pair	3 30	4 20	4 30	5 50	6 50	7 10

To find list price for any size of oiler and number of pressure or gravity sight-feeds, multiply the number of gravity feeds by the list price above per sight-feed, also pressure feeds, and add the combined products to the list price of the desired capacity reservoir. The total is the complete list price subject to discount. If brackets are also wanted add the list price to above total.

See page 346 for gravity Type Multiple Oiler.

LUNKENHEIMER

IMPROVED "PARAGON" GLASS BODY SIGHT-FEED
LUBRICATOR.

For Gas, Gasoline or Oil Engines.

PATENTED.



Exterior.



Sectional.

Fig. 553.

The improved form of Gas Engine Lubricator, shown herewith, and which we have designated by the trade name "Paragon," will be found to adequately fulfill the requirements of the service for which it has been designed. Its construction has been improved over the other forms heretofore on the market, and all objectionable features have been eliminated. The construction is very compact, and the general design, will, we believe, appeal to users of this class of goods.

The filling arrangement consists of a screw-down slide filler. Referring to the sectional illustration, it will be seen that the slide (A) screws down on and around the lid of cup, and has a loose plug which covers the filling hole when slide is swung over to a closed position. This loose plug is so arranged that the wear on same can be taken up by turning down screw (B). The whole construction is very heavy, and the slide can be depended upon to seat perfectly and remain tight for an almost indefinite period. On account of this construction it is possible to secure a large filling hole, which, as users know, is a desirable feature.

Improved "Paragon" Glass Body Sight-Feed Lubricator.—
Continued.

The feed-regulating mechanism is the same as our "Sentinel" pattern oil cup, and the feed can be put on or off by raising or lowering the cam lever (C). The rate of feed can be adjusted by turning nut (D), which is prevented from loosening by spring (E). By this arrangement the feed can be set and turned on or off without disturbing the rate of flow. The cup is thoroughly packed both around the stem and at the top and bottom of body and sight-feed glasses, and cannot become leaky.

The whole cup is secured together by our patented lock-nut construction (not found in other kinds), which makes it impossible for the cup to jar apart, due to the shaking of the engine, and also dispenses with the annoyance of oil leaks. The sight-feed glass (W) is quite large, and can be readily cleaned by unscrewing the upper part of the cup from the base piece.

The shank is fitted with a large ball check valve to prevent the back pressure from escaping into the sight-feed chamber and interfering with the proper formation of the drops, which would otherwise be spattered around the glass. In extreme cases, where the back pressure is unusually great, as on old engines with worn piston rings, the check valve does not entirely remedy the trouble. To meet this condition the sight-feeds are fitted with a "baffle cap" R, placed within the sight-feed glass just above the check valve, which effectually muffles and diffuses the gases that escape past the ball. With these improved, patented features, and by providing a large, free passage through the shank, with ample clearance around the check, the drops form perfectly, drop freely and steadily, and the sight-feed glasses never fill up, thus insuring a constant, even flow of oil to the cylinders.

Where a heavier and more substantial cup is required, we recommend the use of our "Mars" Pattern, which, although not any more efficient in operation, is somewhat heavier in construction.

PRICE LIST.

Size,.....	number	1½	2	3	4	5	6	8
Outside Diameter of Glass,.....	inches	1¾	2	2¼	2½	3	3½	4¼
Height of Glass,.....	inches	1⅝	1¾	2½	2¾	3	4	5
Capacity (Oil),.....	ounces	1½	2½	4	5	10	18	32
Shank Pipe Thread,.....	inch	¼	⅜	¾	¾	½	½	¾
Finished Brass,.....	each	2 00	2 80	3 50	4 00	5 40	7 00	14 00
Nickel Plated,.....	each	2 40	3 25	4 10	4 60	6 25	8 20	16 40

In ordering extra glasses and cork washers, always specify name and size number of cup, as stamped on same.

See page 384 for prices on extra glasses and cork washers

LUNKENHEIMER IMPROVED "MARS" GAS ENGINE LUBRICATOR.

Glass Body.

For Gas, Gasoline or Oil Engines, Air Compressors, Etc

(Patented.)



Fig. 666.

This cup is intended to supply the demand for a heavy, substantial and durable glass body lubricator for vapor engines. The glass body enables the engineer to readily ascertain the amount of oil in the reservoir. The sight feed is large and can be easily cleaned when dirty. It is provided with a check in the shank the same as the "Paragon," described on pages 308 and 309. The feed-regulating device is so arranged that when once set it need never be changed when refilling the cup. It will feed heavy oils regularly, and having a large opening at the top is easy to fill.

DIRECTIONS.

To fill, turn stop cock B up, remove filling plug E and fill full with oil; replace filling plug and open stop cock B wide by turning the lever down, and regulate oil drops with regulating valve C. Never change regulation of valve C unless necessary to feed more oil, as the cup can be refilled without interfering with same.

PRICE LIST.

Size,.....	Number	2	3	4	5	6
Diameter of Glass Body,.....inches	2	2 1/4	2 1/2	3	3 1/2	
Height of Glass Body,.....inches	1 3/4	2 1/4	2 3/4	3	4	
Capacity,.....ounces	2 1/2	4	5	10	18	
Shank Pipe Thread,.....inch	3/8	3/8	1/2	1/2	3/4	
Brass,.....each	5 00	6 00	8 00	10 00	12 00	
All Finished and Nickel Plated,.....each	6 00	7 25	9 50	12 00	14 00	
Extra Sight-Feed Glasses,.....per dozen	60	60	60	60	60	

When ordering extra glass and cork washers, give number of Cup as stamped on same

For list prices on glasses and cork washers see page 384.

LUNKENHEIMER
"VULCAN" FORCE-FEED SIGHT-FEED
LUBRICATOR.

For Gas Engines, Air Compressors, Etc.



Fig. 491.

DESCRIPTION.

A—Oil Reservoir.
D—Piston.

C—Oil Regulating Valve.
E—Thumbnut for raising and regulating piston.

This cup will be found an excellent lubricator for feeding heavy oils, when cold, to gas engine and air compressor cylinders, as the spring-actuated piston causes a "force-feed." It has proven by tests to be a most perfect cup for the purpose intended, and is also recommended for use on bearings requiring heavy oil. Do not feed grease in this cup.

DIRECTIONS.

Turn thumbnut E to the right until the plunger is drawn to top of cup, then unscrew cover and fill the cup with oil. Replace cover and adjust pressure on oil by screwing up thumbnut E to top of piston stem. Regulate the drops by turning valve C. This cup is provided with our improved sight-feed, which dispenses with the necessity of packing glass tubes. Broken glasses can be easily replaced at slight expense, but as these glasses are extra heavy, it is seldom, if ever, that they have to be replaced.

PRICE LIST.

Number,.....	1	2	3	4	5
Outside Diameter of Cup,.....inches	2	2 $\frac{3}{8}$	3 $\frac{1}{4}$	3 $\frac{3}{8}$	4 $\frac{1}{4}$
Capacity (Oil),.....ounces	1 $\frac{1}{2}$	3	4 $\frac{1}{2}$	6 $\frac{1}{2}$	15
Shank Pipe Thread,.....inch	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1
Brass,.....each	5 00	6 00	8 00	10 00	15 00
All Finished and Nickel Plated,.....each	6 00	7 25	9 50	12 00	17 50
Extra Sight-Feed Glasses,.....per dozen	60	60	60	60	60

SECTION X.

OIL PUMPS.

LUNKENHEIMER **"ALPHA" GLASS BODY OIL PUMP.**



Fig. 495.

THE LUNKENHEIMER GLASS BODY OIL PUMP is easily filled and operated and is intended to be used in connection with Sight-Feed Lubricators on Stationary or Marine Engines. No large engine should be without a cup of this kind as an auxiliary to the Sight-Feed Lubricator.

Great care is exercised in the manufacture of these Pumps and they are tested thoroughly before being sent out from our factory, and we guarantee them to be perfect working cups and first-class in every way.

PRICE LIST.

Size, number	3	5	6	8
Outside Diameter of Glass, inches	2¼	3	3½	4¼
Height of Glass, inches	2½	3	4	5
Capacity,	½ Pint	½ Pint	1 Pint	1 Quart
Shank Pipe Thread, inch	¾	¾	¾	¾
Finished Brass, each	7 50	8 50	10 00	15 00
Nickel Plated, each	8 25	9 50	11 00	16 50
Extra Glasses, each	15	35	65	1 50
Extra Cork Washers, per dozen	45	60	75	1 50

We can still furnish glasses and cork washers for our old sizes, i. e., numbers one and two, and when ordering be sure and give these numbers to distinguish them from the sizes now made.

LUNKENHEIMER

"UNIVERSAL" HAND OIL PUMP.



Fig. 853.

This form of oil pump is preferred by some users to the lever pattern, which we originated and have sold for over twenty-five years. The "Universal" Hand Oil Pump is easy to attach, fill and operate, and works well under high pressure. It can be made to attach either vertically or horizontally by transposing plug (B) and shank (A), which are interchangeable. This is a decided improvement over all other makes of this type of oil pump, as it permits of adapting the pump to meet any requirements of position: i. e., it can be connected either into the steam pipe or steam chest. As shown in cut above it is arranged for vertical connection.

The filling hole is closed by a hinged cap, which keeps out dust and dirt, and in addition there is a removable wire gauze strainer to insure clean oil. The plunger is well made and very durable. All parts about the pump are heavy, large, well constructed and not liable to get out of order easily. They are well designed and finished and present a handsome and ornamental appearance. Where required these pumps can be furnished with brass instead of glass body shown in cut. In ordering be sure and state size as specified below, also whether wanted finished brass or nickel plated. Unless otherwise specified all orders will be filled with glass body pumps.

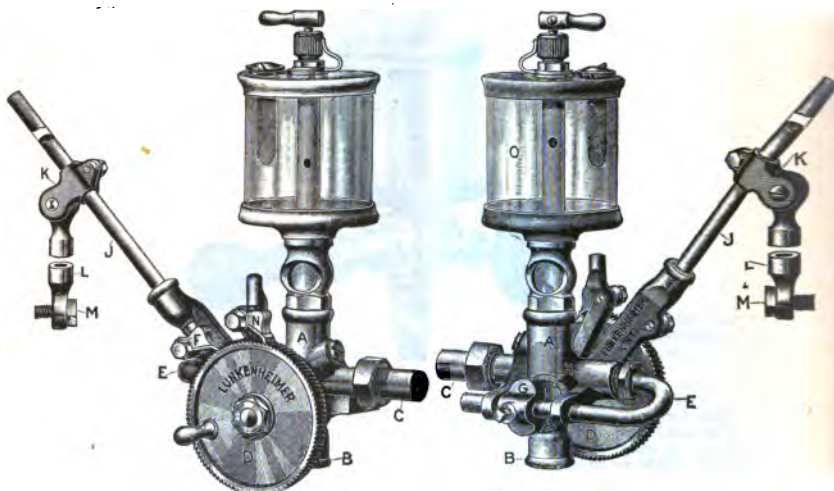
PRICE LIST.

Size,.....	Number	3A	5A	6A	8A
Outside Diameter of Glass,.....inches		2½	3	3½	4½
Height of Glass,.....inches		2½	3	4	5
Capacity,.....		½ Pint	½ Pint	1 Pint	1 Quart
Shank Pipe Thread,.....inch		¾	¾	½	½
Glass Body, Finished Brass, Fig. 853,.....each		7 50	8 50	10 00	15 00
Glass Body, Nickel Plated, Fig. 853,.....each		8 25	9 50	11 00	16 50
Brass Body, Finished Brass, Fig. 290,.....each		8 30	9 50	11 00	16 50
Brass Body, Nickel Plated, Fig. 290,.....each		9 10	10 30	12 20	18 20
Extra Glasses,.....each		15	35	65	1 50
Extra Cork Washers,.....per dozen		45	60	75	1 50

When ordering glasses or cork washers specify size number of pump as stamped on same.

All genuine Oil Pumps have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
"MARVEL" SINGLE FEED MECHANICAL OIL
PUMPS.



Front View.

Rear View.

Fig. 912, with Oil Cup

Fig. 913, without Oil Cup.

Realizing the demand for a positive mechanically operated lubricator, and as the result of considerable study and experimenting to produce a first-class lubricator of this kind, we offer to the trade the pump shown above. This method of lubrication is more reliable than that obtained by lubricators hydrostatically operated, and when properly constructed the oiling is absolutely positive, and all of the oil fed to the pump is bound to be forced to the steam chest or cylinder of the engine.

Referring to the illustration it will be seen that the driving mechanism is of the ratchet type and is operated by the clutches (F) and (N) that work cooperatively by the motion of the rod (J), which can be attached to the eccentric rod, or other moving parts of the engine, by the couplings (K) and (M). The motion thus obtained is transmitted to the piston (E) by the crank-pin mechanism (H) and (G).

"Marvel" Single Feed Mechanical Oil Pump.—Continued.

The ratchet wheel (D) is provided with a handle whereby it can be rotated by hand in case it is desirable to force a quantity of oil at any time, as, for example, when starting the engine.

By moving the part (K) up or down the rod, the stroke of the pump can be lengthened or shortened, as desired, thus regulating the amount of oil fed by the pump independent of the feed from the oil cup. The joints of the cup are tight, the sight-feed glass being packed so as to prevent the access of air, which would have a tendency to cause the cup to feed after the engine had ceased running. This construction, and the use of check valves in the pump, prevents oil supply from wasting.

The outlet (C) is piped to the steam pipe or chest of the engine, and the spring check valve (X) should be placed as near the end of the pipe as possible, preferably into the steam pipe.

The bottom of the pump body (B) is tapped $\frac{3}{4}$ inch bolt thread to receive a stand, so that it can be placed wherever desired.

The pump is substantially constructed, the workmanship being first-class, and, as the parts are made to jigs and templates, they can all be easily renewed, being perfectly interchangeable.

The ratchet wheel (D), pawls (F) and (N), piston (E) and crank shaft are made of tool steel, tempered and hardened. All other metal parts about the pump are made of the very best hard bronze composition.

The Lunkenheimer Mechanical Oil Pump has no equal in regard to simplicity and positiveness of operation. They are carefully tested before shipment and satisfaction is guaranteed. The pump is listed with or without oil cup. The filling hole is of large area, so as to be easily filled; it is also fitted with a strainer and hinge cap, which can not be lost.

It is usually supplied with our No. 6 1-pint capacity "Sentinel" snap lever sight-feed cup, Fig. 546. Unless otherwise specified, they will be sent complete with oil cup.

PRICE LIST.

Style.	Finished Brass	Nickel Plated
Pump without Oil Cup, Fig. 913,..... each	16 00	18 00
Pump with 1 Pint Oil Cup, Fig. 912,.....each	19 00	21 00
Pump with 1 Quart Oil Cup, Fig. 912,.....each	24 00	26 50

All genuine Oil Pumps have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

**"IMPERIAL" SINGLE-FEED MECHANICAL
OIL PUMPS.**

With Compression Oil Cup.

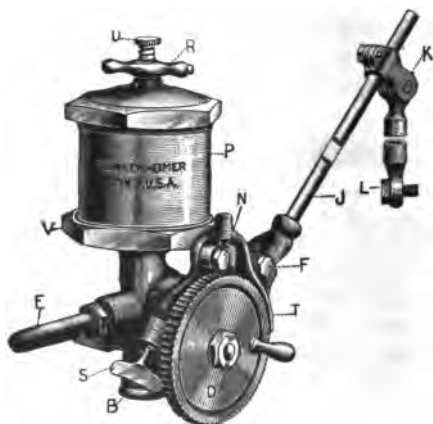


Fig. 952.

The Lunkenheimer "Imperial" Single-Feed Mechanical Oil Pump with Compression Oil Cup is especially adapted for traction engines, etc., where a heavy oil is to be used, or for a mixture of graphite and oil. The body is entirely of brass and of heavy construction, suited for rough usage.

The compression cup has a leather plunger which is so constructed that it is easily raised when cup requires recharging. The spring and plunger are conveniently controlled by thumb-nut (R), provided with an automatic lock arrangement to prevent its jarring from position on stem. This style cup possesses features not found in other makes.

The construction of the pump is the same as that described on pages 316 and 317, but the method of regulating the feed is different, being as follows: Loosen thumb-nut (B) and set rider (T) so as to take up as much of the stroke as required to get the desired feed. By moving the part (K) up or down the rod, the stroke of the pump can be lengthened or shortened, as desired, thus regulating the amount of oil fed by the pump independent of the feed from the oil cup. As the pump is constantly flooded, there is no possibility of it not feeding by becoming air bound.

The bottom of the pump body (B) is tapped $\frac{1}{4}$ inch bolt thread to receive a stand, so that it can be placed wherever desired.

PRICE LIST.

Finished Brass.....each	24 00
Nickel Plated, One Pint Capacity..... each	26 00

LUNKENHEIMER
"KING" SINGLE-FEED MECHANICAL OIL PUMP.

With Pressure Oil Cup.

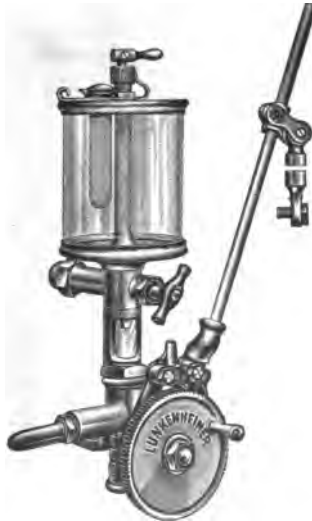


Fig. 950.

The above is extensively used in connection with Oiling Systems where the oil is fed under pressure and consists of our Mechanical Oil Pump, described on pages 316 and 317, with a No. 6 Pressure Oil Cup (see pages 365 and 367) attached.

The object of this combination is to provide means for supplying the steam cylinder with oil should accident happen the Oiling System.

By referring to the above mentioned pages, a complete description of both the Mechanical Pump and Pressure Oil Cup can be had.

PRICE LIST.

Finished Brass, with No. 6 Pressure Oil Cup,.....each	24 00
Nickel Plated, with No. 6 Pressure Oil Cup,.....each	26 00

LUNKENHEIMER
"MARVEL" DOUBLE-FEED MECHANICAL
OIL PUMPS.

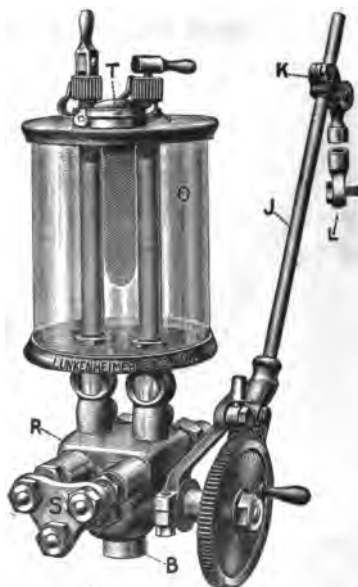


Fig. 949.

The Lunkenheim Double-Feed Mechanical Oil Pump is adapted for large tandem or cross compound engines, or any place where a first-class, reliable pump is required to force two independent feeds, as, for example, to tap the steam chest over the steam valves of a Corliss engine, and in this way get the oil at once to the places where it is most needed.

The construction of the above is similar to that on pages 316 and 317.

The bottom of the pump body (B) is tapped $\frac{3}{8}$ inch bolt thread to receive a stand, so that it can be placed wherever desired.

The oil cup is of a special design with two "Sentifol" style feed regulating stems and also two sight-feeds, so that the quantity of oil supplied to each feed may be regulated independently.

The filling hole (T) is of large area so the cup is easily filled; it is also fitted with a strainer and hinge cap, which can not be lost.

PRICE LIST.

Style,	Brass Finished	Nickel Plated
Double Feed Pump with One Quart Capacity Cup,.....each	30 00	33 00

LUNKENHEIMER
"AUTO" MULTIPLE FEED MECHANICAL
LUBRICATOR.

For Gasoline Automobiles

Patent Applied For.

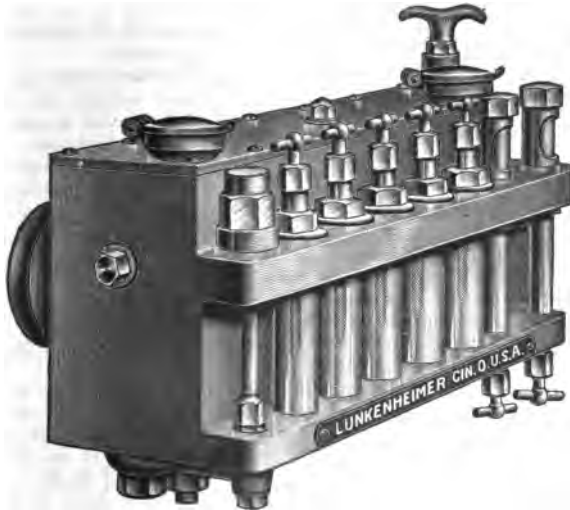


Fig. 953.

This lubricator has been designed especially for automobiles and fulfills the requirements of automobile manufacturers and users, all of the peculiar features necessary for the proper lubrication of horseless vehicles having been considered and successfully accomplished. The lubricator is very neat and compact in design, occupying but little space, and does not interfere with any of the other working parts of the automobile.

The thorough trials given our Automobile Lubricator and its general adoption by the leading automobile manufacturers are more than a guarantee for its positive and practical operation. It is light in weight, simple and durable in construction, and if properly connected the operator need have no further concern as to proper lubrication.

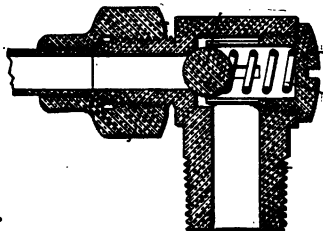
The body and lid are made of aluminum, thereby reducing the weight of the lubricator to a minimum. The trimmings are made of either hardened tool steel or hard bronze composition, the moving steel parts in all instances having bronze bearings, which greatly reduces the friction and wear.

One of the many desirable features about our Automobile Lubricator is, that all parts subjected to wear can be readily renewed should necessity require, but as all these parts constantly work in oil the machine will stand long and severe usage without wear.

As it is desirable that the oil for the crank and its bearings be of a heavier grade than that used for the cylinders, a separate compartment has been provided, from which the oil is taken and forced to the crank casing by means of a hand pump. The oil in the large compartment is forced to the cylinders and clutch collar by means of the five feeds mechanically operated by the engine.

A sight feed is provided for every oil outlet, which feature is highly essential, as it enables the operator at a glance to ascertain whether the various cylinders or bearings are being properly oiled—it sometimes happening that foreign matter in the oil becomes lodged in the passages, preventing the necessary flow.

"Auto" Multiple Feed Mechanical Lubricator.—Continued.



Every drop of oil that falls into the sight-feed glass is bound to be forced to the part to be lubricated; it is absolutely positive in action.

The gauges at the end of the lubricator indicate the quantity of oil in the two compartments.

The Lunkenheimer Lubricator supplies the engines and their bearings with oil only when the engines are running and stops feeding when the engines

stop. This is a very desirable feature, for should the oil continue to flow after the engines have stopped a considerable waste would result should the operator neglect to close the valve. In our construction it is not necessary to close the valve when the engines stop, though should it be desired at any time while the engines are running to stop any one of the feeds, the same can be easily done by means of the valves shown above the sight feeds.

The Lubricator is attached to the dash board of an automobile by means of the studs on the back of same. A hole is drilled in the dash through which the shaft extends, and on the other side of the shaft is placed a pulley or sprocket wheel. By placing the Lubricator in this position the operator can see at a glance whether the engines, etc., are getting their proper supply of oil.

The detail view illustrates our angle check valve which is placed at the ends of the five automatic feed pipes. One end has a $\frac{1}{4}$ -inch pipe thread, while the other is threaded to receive our union ring, as shown. The pipe-threaded end is screwed directly into the cylinders or clutch collar. It is highly essential that these checks be used at the ends of all feeds, automatically fed, as a more positive supply of oil can then be assured. By using these checks the pipes are always kept filled, and the same amount of oil forced into one end of the pipe will immediately be forced out at the other end into the cylinders, etc.

While we have described and illustrated but one pattern of our Automobile Lubricator, we are prepared to furnish any desired size with more or less than five automatic feeds and with one or two push pumps or without any at all. Upon request we will be pleased to furnish anyone interested with a copy of our "Auto" Multiple Feed Mechanical Lubricator Booklet, which thoroughly illustrates and describes in detail the entire construction.

PRICE LIST.

Five Feed, "Auto" Multiple Feed Mechanical Lubricator	each	60 00
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SECTION XI.

OILING DEVICES.

LUNKENHEIMER

IMPROVED OILING DEVICES.

On pages 325, 326 and 327 are illustrated the application of Lunkenheimer Improved Oiling Devices to various types of engines for the lubrication of eccentrics, crank pins, cross head pins, bearings, etc.

The simple and easy manner of attaching these devices will be readily understood and their positive and reliable service will be greatly appreciated. They are very economical, can be finely adjusted and present a very neat and handsome appearance.

We show but a few of the many arrangements of oiling devices, as there are quite a number of combinations that could be designed. From what we show, however, their general application can be readily ascertained, and they will doubtless aid the engineer in designing any other combination desired.

Referring to pages 336 to 341 inclusive, it will be seen that we manufacture three different styles of sight-feed valves. We would ask that these pages be carefully read and the merits of the different devices be ascertained before ordering.

While we have shown throughout the different designs our "Sentinel" Oil Cup applied, we will nevertheless furnish any other style of oil cup desired which we manufacture, illustrations and descriptions of which will be found in the Oil Cup Section of this catalogue, pages 359 to 384 inclusive.

HOW TO ORDER.

If the device desired is similar to any of the illustrations shown on following pages, give the figure number of cut.

Give name or figure number and size of oil cup wanted.

State style of sight feed valves desired.

Be sure to give all the dimensions called for by dimension lines on cuts.

Give stroke of engine.

State whether trimmings are to be nickel-plated or plain brass.

If a drip trough is wanted in place of a wiper cup, be sure to give the throw of the eccentric.

Give name and style of engine that oiling device is intended for.

If the cuts shown on following pages do not illustrate the design of oiling device desired, we would request that the general dimensions as called for in the illustrations be given, together with all the other information asked for above, and if possible send rough sketch of exactly what is wanted.

We would be pleased to give our assistance in the design of any particular style of oiling device and earnestly solicit inquiries on the subject.

Lunkenheimer Improved Oiling Devices.—Continued.

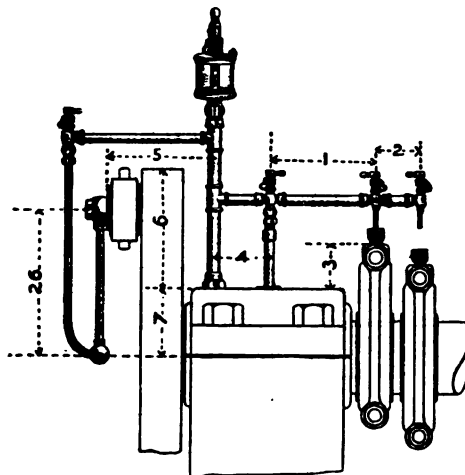


Fig. 147.

Device for Oiling Pillow Block, two Eccentrics and Crank Pin from one Oil Cup.
See page 324 for description and directions for ordering.

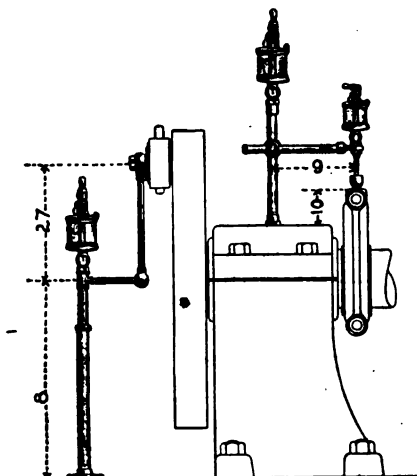


Fig. 148.

Crank Pin, Pillow Block and Eccentric Oiling Device.
See page 324 for description and directions for ordering.

Lunkenheimer Improved Oiling Devices.—Continued.

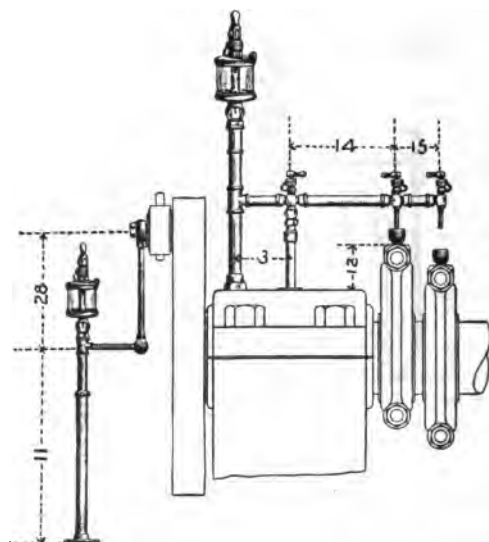


Fig. 149.

Crank Pin, Pillow Block and Eccentric Oiling Device.

See page 324 for description and directions for ordering.

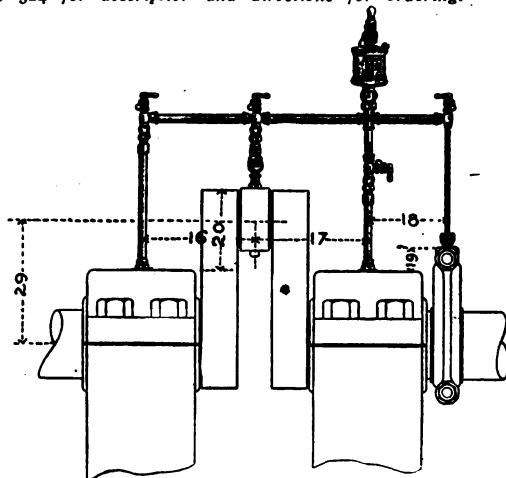
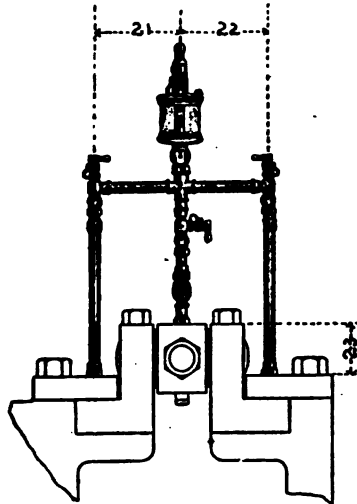


Fig. 150.

Device for Oiling Pillow Blocks, Crank Pin and Eccentric from one Oil Cup.

See page 324 for description and directions for ordering.

Lunkenheimer Improved Oiling Devices.—Continued.



No. 151,

Cross Head and Slide Oiling Device.

See page 324 for description and directions for ordering.

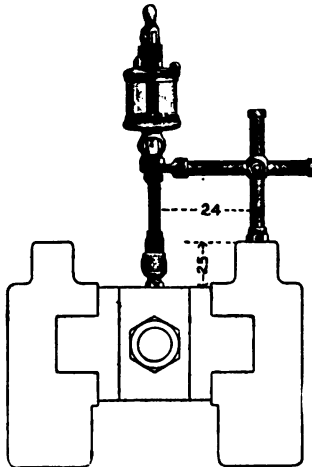


Fig. 152.

Cross Head Oiling-Device.

See page 324 for description and directions for ordering.

LUNKENHEIMER ADJUSTABLE CENTRIFUGAL CRANK PIN OILING DEVICES.

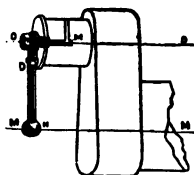


Fig. 508.
Plain Oiler Arm.

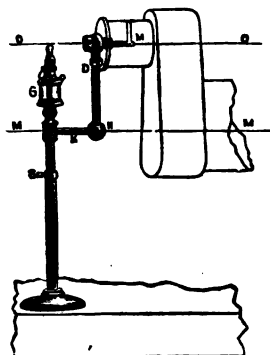


Fig. 509.
Oiler Arm Complete with Floor Stand
and Oil Cup.

These devices furnish means for efficiently lubricating the crank-pin bearings of engines, and are in no way to be compared in quality with the flimsy devices made of thin tubing and light castings commonly placed on the market. Lunkenheimer Centrifugal Oilers are substantially constructed of the very best materials, neat and graceful in design, and with proper care will last as long as the engine to which they are attached. They are very economical in the use of oil, and in the case of the complete oiler, Fig. 509, the oil can be delivered continuously in any desired quantity to the crank-pin bearing, without stoppage of engine. When ordering these oilers always be particular to give the necessary dimensions of engine as detailed below.

The Plain Oiler Arm, Fig. 508, is intended to be used as an auxiliary to the crank-pin cup to afford an extra and direct means of lubricating the crank pin while the engine is in motion, by squirting oil with an oil can through the hole in ball H. *In ordering these give stroke of engine.*

The Complete Device with Adjustable Oil Cup Stand, Fig. 509, gives direct continuous lubrication to the crank pin from the oil cup on the floor stand. *In ordering these give stroke of engine and distance from center of crank shaft to floor.*

Crank Pin Oiling Devices.—Continued.

In ordering this device always state which style is desired, and when not otherwise specified we will send our "Sentinel" Sight-Feed Oil Cup (page 363), either No. 3, 4 or 5, used respectively on the No. 1, 2 or 3 oiling device.

DIRECTIONS FOR APPLYING.

Drill a hole lengthwise in crank pin and tap same to accommodate the shank of oiler bolt O, which is $\frac{3}{8}$ -inch pipe thread on Nos. 1 and 2, and $\frac{1}{2}$ -inch pipe thread on No. 3 size, unless otherwise specified. Drill a smaller hole M to connect to bearing; adjust the tubing at D to allow the ball H to revolve in line with the axis of the shaft M, then screw bolt O down tightly to keep oiler arm in position. To attach oiler stand fasten floor plate and adjust oiler stand, previously inserting connecting tube K in the hole of ball H.

PRICE LIST.

Number.....	1	2	3
Length of stroke.....	Up to 16 inches	Up to 30 inches	Up to 60 inches
Thread on bolt (O).....pipe thread	$\frac{3}{8}$ inch	$\frac{3}{8}$ inch	$\frac{1}{2}$ inch
Plain Oiler Arm, Brass.....each	6 00	7 00	9 00
Plain Oiler Arm, Nickel Plated.....each	7 00	8 00	11 00
Complete, Brass.....each	15 00	17 00	21 00
Complete, Nickel Plated.....each	18 00	20 50	25 00

The length of oiler arm is always half the length of stroke of engine, and the above prices on the complete device are based on furnishing a stand of ordinary height, but where specifications call for stands higher than 24 inches on the No. 1 device, 36 inches on the No. 2 and 40 inches on the No. 3, we will have to make an additional charge covering the extra height.

LUNKENHEIMER
ADJUSTABLE CRANK PIN OILING DEVICE.

Used in Connection with Pressure Systems.

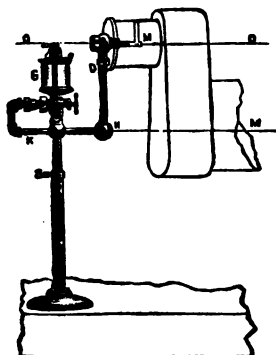


Fig. 289.

The above device is somewhat similar to that shown on pages 328 and 329, but is intended for use in connection with pressure oiling systems. The oil is fed under pressure through the telescopic standard to the shank of the Pressure Oil Cup, where the quantity of oil to be fed can be regulated to a nicety.

Our No. 5 Pressure Oil Cup (see page 365) is used in connection with the above Oiling Device, from which is derived one of the principal advantages of the device. This advantage consists in an auxiliary supply of oil to be used in case that obtained by the pressure system should become exhausted, in which event the oil carried in the cup can be fed to the crank pin in the same manner as explained on pages 328 and 329.

When ordering, be sure to give stroke of engine and distance from center of crank shaft to floor. Directions for attaching will be found on page 329.

PRICE LIST.

Number,.....	1	2	3
Length of Stroke, .....Inches	Up to 16 inches	Up to 30 inches	Up to 60 inches
Thread on Bolt (O),.....Pipe Thread	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
Complete, Brass,.....each	22 50	27 00	33 00
Complete, Nickle-Plated, .....each	24 00	29 50	35 50

The length of oiler arm is always half the length of stroke of engine, and the above prices on the complete device are based on furnishing a stand of ordinary height, but where specifications call for stands higher than 24 inches on the No. 1 device, 36 inches on the No. 2 and 40 inches on the No. 3, we will have to make an additional charge covering the extra height.

LUNKENHEIMER

COUPLINGS, ADJUSTABLE BRACKETS AND CAPS.

For Oiling Devices



Fig. 294.
Coupling for Standard.



Fig. 291.
Cap for End of Oil Pipe.



Fig. 295.
Oil Cup Bracket, Single Connection.



Fig. 285.
Oil Cup Bracket, Double Connection.



Fig. 293.
Oil Pipe Adjuster.



Fig. 292.
Oil Pipe Reducing Adjuster.

To aid the engineer in erecting his own oiling devices, we can supply the above, which facilitates the labor of erection and reduces the cost to a minimum.

Their application can readily be ascertained by reference to the preceding pages.

Besides these trimmings only a few lengths of brass tubing (iron pipe size) are necessary.

The reducing adjusters (Fig. 292) are designed to couple with one size smaller horizontal than vertical pipe.

When ordering be sure to give the figure number.

Prices on application.

LUNKENHEIMER

"H-W" CROSS HEAD PIN OILERS.

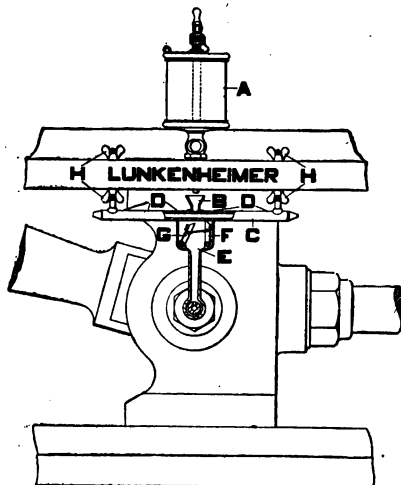


Fig. 955.

The Lunkenger "H-W" Cross-Head Pin Oiler can be applied to any horizontal engine, and was designed and patented by Messrs. Harvey & Wheaton, of Philadelphia, Pa., practical engineers of long experience.

Every drop of oil is carried directly and positively to the pin; consequently, the oil that is usually splashed around the floor and engine is saved. The oiler does not splash in the least, and the floor and frame of engine do not present that unsightly appearance usually seen around cross-head pin oilers.

The adjustment is simple and can be accomplished while the engine is running should necessity require. The thumb nuts H are used for this purpose.

Should an accident happen to the oil cup, preventing it from feeding, or should it be desired to feed a greater quantity of oil to the pin, the same can be done by feeding oil in the funnel B by means of an oil can, while the engine is running. A steady stream of oil can be fed into the funnel B without wasting a drop.

"H-W" Cross Head Pin Oilers.—Continued.

Referring to illustration on opposite page, the oil from the cup A is fed by gravity into the funnel B of the oil tube C. It then overflows through the small holes D in the top of the tube C, enveloping the outside of the tube with a thin film of oil. The wiper cup E, being rigidly attached to the pin, travels therewith directly under the tube C. As the piston rod travels to the left, the tongue F scrapes the oil off the bottom of the tube. A reverse motion of the piston rod throws the tongue F down, but as tongues F and G are directly connected, G is thereby thrown in a vertical position and, in turn, scrapes the oil off the tube C.

This action is repeated upon every forward or backward motion of the piston. Leather buffers are attached to the back of each blade, which prevents noise when wiper head is in motion. The oil dropping into the wiper cup forms a column in the shank thereof, and as the shank is considerably higher than the oil outlet in the pin, the oil is fed under pressure, thereby insuring a more positive feed.

Care should be taken to place the tube C in a perfectly parallel plane with the travel of the wiper cup E. When the tongues F and G are in a vertical position they should barely miss the bottom of oil tube C.

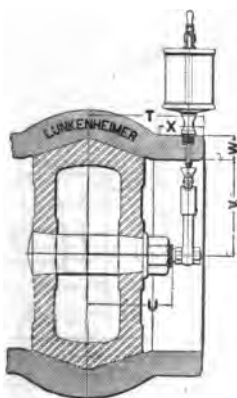
The tube C should be placed directly in the center of travel of the cross-head. Unless otherwise specified, our devices are furnished with $\frac{1}{4}$ " pipe threaded shank, which is to be screwed directly into the cross-head pin, and we would recommend that this size be used if possible.

To facilitate ordering we illustrate on this and the two following pages cuts of the different types of cross-head design; and also show methods of attaching the oiler. If the directions given below each type are strictly followed, orders will be quickly and correctly filled.

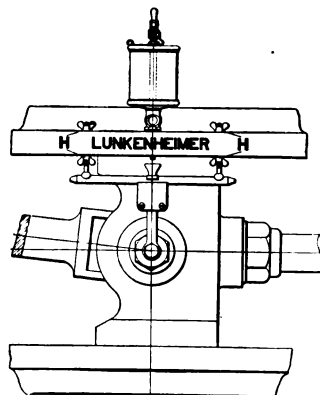
LUNKENHEIMER

"H-W" CROSS HEAD PIN OILER

Applied to a Girder Frame Engine in which Dimension V is under 8 inches.



Section through Cross Head Pin.



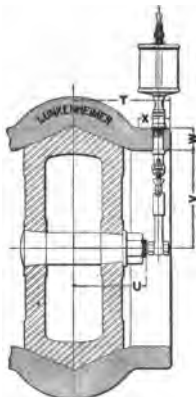
Side View.

The above shows method of attaching Oiler to a Girder Frame Engine in which the distance V is under eight inches. If these cuts illustrate your design of engine frame be sure to give all of the dimensions indicated above, also length of stroke.

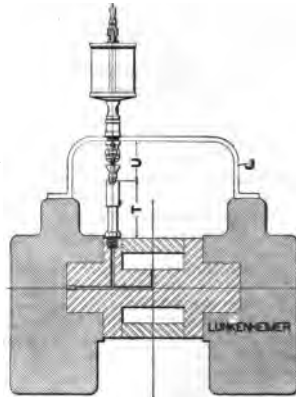
THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

"H-W" Cross-Head Pin Oilers.—Continued.

Lunkenheimer H-W Cross-Head Pin Oiler attached to Girder Frame Engine in which the distance V exceeds 8"—also to Center Crank Engine.



Girder Frame Engine.

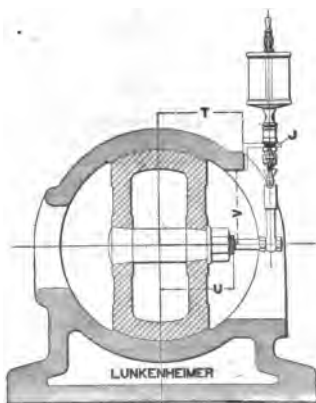


Center Crank Engine.

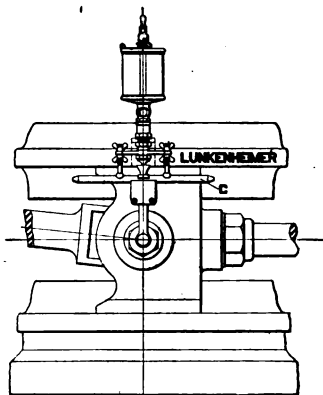
The support J shown in Center Crank Engine illustration above is not furnished by us, but can be easily and cheaply forged of common wrought iron. The dimension T shown on this illustration cannot be less than $4\frac{3}{4}$ ", and U not less than $4\frac{1}{4}$ ".

If either of these cuts illustrate your design of engine frame be sure to give all of the dimensions indicated above, also the length of stroke, and state the design of frame.

Lunkenheimer "H-W" Cross Head Pin Oiler Attached to Box Frame Engine.



Section through Cross-Head Pin.

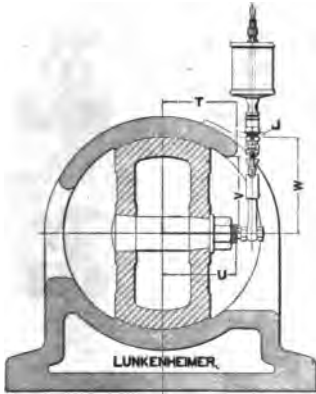


Side View.

When the dimensions T and V do not permit of the cup being directly attached to the frame, the bracket J is resorted to. We do not furnish this bracket, but same can be easily and cheaply forged of wrought iron.

If the above cuts illustrate your design of engine frame be sure to give all of the dimensions indicated above, also the length of stroke, and state the design of frame.

"H-W" Cross Head Pin Oiler.—Continued.



Section Through Cross-Head Pin.

**LUNKENHEIMER
"H-W" CROSS-HEAD PIN
OILER ATTACHED TO
BOX FRAME
ENGINE.**

This design of frame does not differ very much from that shown on page 334 at the bottom.

The bracket J is resorted to when the dimensions T and V do not permit of the cup being directly attached to the frame.

We do not furnish this bracket, but same can be cheaply made of common wrought iron.

If the above cuts illustrate your design of engine be sure to give all of the dimensions indicated above, also the length of stroke, and state the design of frame.

PRICE LIST.

Size, .....number	• 1	2	3
Stroke of Engine, .....inches	Up to 16	Up to 30	Up to 60
Length of Oil Tube C, .....inches	6	9	12
Finished Brass, Fig. 955, .....each	19 00	24 00	29 00
Nickel Plated, Fig. 955, .....each	20 00	25 00	30 00

The above list prices do not include Oil Cups. In ordering specify whether wanted with or without Oil Cup. The device will always be furnished without oil cup unless otherwise ordered.

LUNKENHEIMER
PATENT DRIP AND SIGHT-FEED VALVES,
WIPER CUPS, ETC.

Oiling Devices for Engine and Machinery Bearings.



Fig. 499.
Cross Drip Valve.



Fig. 490.
Straight Drip Valve.



Fig. 500.
Angle Drip Valve.



Fig. 296.
Corner Drip Valve.



Fig. 688.
Cross Sight-Feed
Valve.



Fig. 501.
Straight Sight-Feed
Valve.



Fig. 502.
Angle Sight-Feed
Valve.



Fig. 964.
Corner Sight-Feed
Valve.



Fig. 689.
Cross Sight-Feed
Valve, with Union.



Fig. 593.
Straight Sight-Feed
Valve, with Union.



Fig. 594.
Angle Sight-Feed
Valve, with Union.



Fig. 965.
Corner Sight-Feed
Valve, with Union.



Fig. 503.
Adjustable Wick
Wiper Cup.



Fig. 504.
Adjustable Wick
Wiper Cup
with Elbow Shank.



Fig. 578.
Adjustable Wiper
Cup for Crank
Pin.



Fig. 579.
Adjustable Plain
Wiper Cup with
Elbow Shank.



Fig. 969.
Plain Wiper
Cup.



Fig. 969.
Adjustable Plain
Wiper Cup
with Straight Shank.



Fig. 552.
Horizontal Wick
Wiper Cup.



Fig. 506.
Oil Cup Wiper
Tip.



Fig. 507.
Drip Trough.

For description and price list see page 337.

Drip and Sight-Feed Valves, Wiper Cups, Drip Troughs, Etc.— Continued.

On the preceding page is shown some of the various styles of oiling devices which we manufacture. They are intended to be used in connection with brass pipe and fittings and so adapted as to oil all of the bearings of an engine from one or two centrally located oil cups of large size. We can make any kind of oiling device, but owing to the variety of conditions attending their application, we would request parties, when writing regarding these goods, to give us, if possible, a sketch showing dimensions and style of engine for which device is required.

These fittings are neat and practical in construction, handsomely finished and convenient and economical in operation. Sight feed and drip valves are made in $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ inch sizes. Drip valve outlets are threaded for $\frac{1}{4}$ -inch O. D. brass tubing, 27 threads. Unless otherwise specified, $\frac{3}{8}$ -inch valves will always be sent and unions on sight feed valves will be tapped for $\frac{1}{4}$ -inch pipe.

Wiping devices will also be furnished for $\frac{3}{8}$ -inch pipe unless otherwise ordered.

PRICE LIST.

Size, .....inches	Finished Brass.		Nickel Plated.	
	$\frac{1}{8}$, $\frac{1}{4}$, or $\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$, $\frac{1}{4}$, or $\frac{3}{8}$	$\frac{1}{2}$
Fig. 499, Cross Drip Valve,.....each	1 50	1 60	1 75	1 85
Fig. 690, Straight Drip Valve,.....each	1 25	1 40	1 50	1 65
Fig. 500, Angle Drip Valve,.....each	1 25	1 40	1 50	1 65
Fig. 296, Corner Drip Valve,.....each	1 50	1 60	1 75	1 85
Fig. 688, Cross Sight-Feed Valve,.....each	2 30	3 20	2 60	3 50
Fig. 501, Straight Sight-Feed Valve,.....each	2 00	3 00	2 25	3 25
Fig. 502, Angle Sight-Feed Valve,.....each	2 00	3 00	2 25	3 25
Fig. 964, Corner Sight-Feed Valve,.....each	2 30	3 20	2 60	3 50
Fig. 689, Cross Sight-Feed Valve with Union,.....each	2 80	3 70	3 10	4 00
Fig. 593, Straight Sight-Feed Valve with Union,each	2 50	3 50	2 80	3 80
Fig. 594, Angle Sight-Feed Valve with Union,each	2 50	3 50	2 80	3 80
Fig. 965, Corner Sight-Feed Valve with Union,each	2 80	3 70	3 10	4 00
Fig. 969, Adjustable Plain Wiper Cup, Straight Shank,.....each	2 50	3 00	3 00	3 50
Fig. 579, Adjustable Plain Wiper Cup, Elbow Shank,.....each	3 00	3 50	3 50	4 00
Fig. 503, Adjustable Wiper Cup for Wick, Straight Shank,.....each	2 50	3 00	3 00	3 50
Fig. 504, Adjustable Wiper Cup for Wick, Elbow Shank,.....each	3 00	3 50	3 50	4 00
Fig. 578, Adjustable Crank Pin, Wiper Cup,.....each	2 50	3 00	3 00	3 50
Fig. 552, Horizontal Wick Wiper Cup,.....each	2 00	2 30	2 30	2 60
Fig. 506, Wiper Tips,.....each	40	50	50	60

Fig. 505. Plain Wiper Cup.				Fig. 507. Drip Troughs.				
Pipe Th'd.	O. Diam.	Brass.	Nickel Pl.	Length.	Pipe Th'd.	Rough.	Finished.	Nickel Pl.
$\frac{1}{4}$	1 $\frac{1}{4}$	1 00	1 20	3 inches	$\frac{1}{4}$	75	1 00	1 25
$\frac{3}{8}$	1 $\frac{1}{2}$	1 50	1 75	5 "	$\frac{3}{8}$	1 00	1 50	2 00
$\frac{1}{2}$	2	2 00	2 40	7 "	$\frac{1}{2}$	1 50	2 00	2 75
				9 "	$\frac{3}{4}$	2 00	2 75	3 50

SNAP LEVER SIGHT-FEED VALVES.

Oiling Devices for Engine and Machinery Bearings.

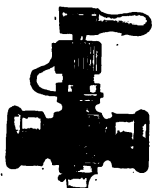


Fig. 344
Cross Drip
Valve.

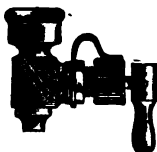


Fig. 346.
Straight Drip
Valve.



Fig. 345.
Angle Drip
Valve.



Fig. 299.
Corner Drip
Valve.

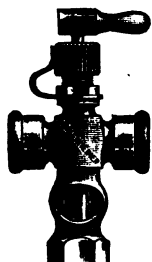


Fig. 341.
Cross Sight-Feed
Valve.

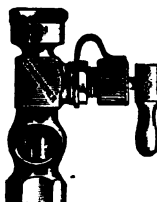


Fig. 343.
Straight Sight-Feed
Valve.



Fig. 342.
Angle Sight-Feed
Valve.



Fig. 298.
Corner Sight-Feed
Valve.

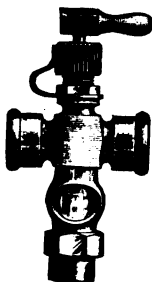


Fig. 338.
Cross Sight-Feed
Valve, with
Union.

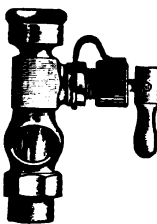


Fig. 340.
Straight Sight-Feed
Valve, with
Union.

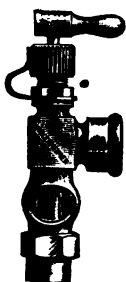


Fig. 339.
Angle Sight-Feed
Valve, with
Union.



Fig. 297.
Corner Sight-Feed
Valve, with
Union.

For description see opposite page.

Snap Lever and Sight-Feed Valves.—Continued.

To facilitate the quick closing and opening of Drip and Sight-Feed Valves, we have designed those illustrated on opposite page. They are equipped with our "Sentinel" Snap Lever arrangement, by means of which the engineer, when stopping or starting the engine, can quickly close or open the oil supply to the various bearings by simply throwing down (to close), or up (to open) the small snap levers. Not only is time saved in the operation, but the principal advantage is derived from the fact that the feed regulation is not affected in the least by this operation, and, therefore, after the feed is once set, it will always remain so.

The regulation is accomplished by the knurled nut beneath the snap lever, which is firmly held from unscrewing by the curved spring.

All valves illustrated on opposite page are made in $\frac{1}{8}$, $\frac{1}{4}$, $\frac{3}{8}$ and $\frac{1}{2}$ inch sizes. Drip valve outlets are threaded for $\frac{1}{4}$ inch O. D. brass tubing, 27 threads. Unless otherwise ordered, $\frac{3}{8}$ inch valves will always be sent and unions on sight feed valves will be tapped for $\frac{1}{4}$ -inch pipe.

PRICE LIST.

Figure Number.	Size, .....inches	Finished Brass.		Nickel Plated.	
		$\frac{1}{8}$, $\frac{1}{4}$, or $\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$, $\frac{1}{4}$, or $\frac{3}{8}$	$\frac{1}{2}$
344	Cross Drip Valve,.....each	1 50	1 60	1 75	1 85
346	Straight Drip Valve,.....each	1 25	1 40	1 50	1 65
345	Angle Drip Valve, .....each	1 25	1 40	1 50	1 65
299	Corner Drip Valve,.....each	1 50	1 60	1 75	1 85
341	Cross Sight-Feed Valve, .....each	2 30	3 20	2 60	3 50
343	Straight Sight-Feed Valve,.....each	2 00	3 00	2 25	3 25
342	Angle Sight-Feed Valve,.....each	2 00	3 00	2 25	3 25
298	Corner Sight-Feed Valve, .....each	2 30	3 20	2 60	3 50
338	Cross Sight-Feed Valve with Union,.....each	2 80	3 70	3 10	4 00
340	Straight Sight-Feed Valve with Union,.....each	2 50	3 50	2 80	3 80
339	Angle Sight-Feed Valve with Union,.....each	2 50	3 50	2 80	3 80
297	Corner Sight-Feed Valve with Union,.....each	2 80	3 70	3 10	4 00

LUNKENHEIMER

PRESSURE SIGHT-FEED VALVES.

Oiling Devices for Engine and Machinery Bearings.

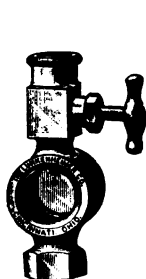


Fig. 960.

**Straight Sight-Feed
Valve.**



Fig. 961.

**Angle Sight-Feed
Valve.**



Fig. 962.

**Cross Sight-Feed
Valve.**



Fig. 963.

**Corner Sight-Feed
Valve.**

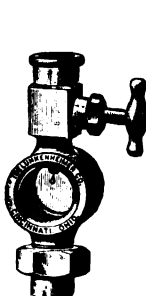


Fig. 956.

**Straight Sight-Feed
Valve, with Union.**



Fig. 957.

**Angle Sight-Feed
Valve, with Union.**



Fig. 958.

**Cross Sight-Feed
Valve, with Union.**



Fig. 959.

**Corner Sight-Feed
Valve, with Union.**

For description and price list see opposite page.

Pressure Sight-Feed Valves.—Continued.

The Lunkenheim Pressure Sight-Feed Valves were designed for use in connection with pressure oiling systems. They are very strong and durable, and are made in several styles to facilitate connecting. Should any of the sight-feed glasses break, they can be quickly and easily renewed. It is very seldom that they break, however, as they are very heavy and strong.

The feed can be regulated to a very fine degree, as the thread on the regulating stem is of fine pitch. The valves are made in sizes ranging from $\frac{1}{8}$ to $\frac{1}{2}$ inch and the size of the inlet pipe threads is the same as that of the outlet. We are prepared, however, to furnish valves with smaller pipe connection on the bottom than at the top, but unless otherwise specified, all connections will be for the same size pipe.

PRICE LIST.

Finish,.....	Finished Brass.				Nickel Plated.			
Size,.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Straight (Fig. 960), Angle (Fig. 961) Sight-Feed Valve, ea.	3 60	4 20	4 50	5 30	4 00	4 60	5 00	5 90
Cross (Fig. 962), Corner (Fig. 963), Sight-Feed Valve,.....ea.	4 20	4 50	5 00	6 10	4 60	5 00	5 60	6 80
Straight (Fig. 956), Angle (Fig. 957), Sight-Feed Valve with Union,.....each	4 20	4 50	5 00	6 10	4 60	5 00	5 60	6 80
Cross (Fig. 958), Corner (Fig. 959), Sight-Feed Valve with Union,.....each	4 50	5 00	6 30	6 80	5 00	5 60	7 00	7 50

LUNKENHEIMER

OIL CUP BASES FOR PRESSURE OILING SYSTEMS.



Fig. 198.
Corner Connection,
Right Hand.



Fig. 197.
Corner Connection,
Left Hand.



Fig. 200.
Angle Connection,
Right Hand.



Fig. 199.
Angle Connection,
Left Hand.



Fig. 196.
Straight Connection.



Fig. 195.
Cross Connection.



Fig. 194.
3-Way Connection.

For description and price list see opposite page.

Oil Cup Bases for Pressure Oiling Systems.—Continued.

Heretofore, the installation of pressure oiling systems, in plants equipped with oiling devices of the gravity type, demanded an entirely new line of oil cups particularly adapted for the system. This of course necessitated a considerable outlay of money for the new cups, and the ones formerly used had to be discarded.

To make it possible to use the old cups in connection with the pressure system we have designed a full line of bases, illustrated on opposite page. No matter what the style of oil cup may be, they can readily be adapted to the use of the system by merely screwing same into the bases, which are provided with large sight-feeds, at all times enabling the easy observation of the oil drops.

The bases are so constructed that the cups are never under pressure but merely act as an auxiliary to the oiling system, being placed in commission only should accident happen the system preventing it from operating.

The cups should always be kept filled with oil, and the valve in same should be tightly closed, unless it is desired to feed from the cup.

The bases are very strong and durable and are provided with a valve, by means of which the oil from the system can be finely regulated.

They are made in various styles to facilitate connection, and by referring to opposite page the location of the different connections can readily be ascertained.

When ordering be sure to give figure number, and clearly state size desired.

The same size pipe thread is used on all connections unless otherwise specified.

PRICE LIST.

Finish,.....	Fini'd Brass, Nickel Plat'd					
Size,..... inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Straight Connection, Fig. 196,.....each	2 00	2 50	3 00	2 30	2 90	3 50
Angle Connection, Right Hand, Fig. 200, Left Hand, Fig. 199,.....each	2 10	2 75	3 40	2 40	3 30	3 90
Corner Connection, Right Hand, Fig. 198, Left Hand, Fig. 197,.....each	3 00	3 10	3 60	3 50	3 60	4 10
Cross Connection, Fig. 195,.....each	3 00	3 10	3 60	3 50	3 60	4 10
Three-Way Connection, Fig. 194,.....each	3 50	3 60	4 10	4 00	4 10	4 70

LUNKENHEIMER

IMPROVED "TRIPLEX" OIL GAUGE.

PATENTED.



Fig. 966.

A very unique and practical design of Oil Gauge for dynamos and other machinery having self-oiling journal boxes is shown in the illustration above. It embodies a number of important and desirable features not found in any other gauge, owing to which quite a demand has been created, perfectly satisfying its numerous users.

The gauge glass is protected by a metallic shield, free to turn, having two oblong slots, through which the height of oil can be seen. One of its features is the easy cleansing of the glass, which is accomplished by simply placing a piece of waste against the glass tube and revolving it with the shield. The fact that the shield can be revolved makes it possible to observe the height of oil in the gauge (no matter in what position the observer may be standing in respect to the gauge) by simply turning the shield until the glass can be seen through one of the slots.

The principal advantage, however, is derived through the improved construction of the ground key located in the bibb-nose body. Turning this key to the right, by means of the small handle attached directly below the shield, makes it possible to drain the gauge independent of the journal box oil receptacle, or by turning the key in the opposite direction, both the gauge and oil receptacle can be drained. By placing the handle parallel with the bibb-nose drain, the gauge will register the amount of oil in the journal box oil receptacle and the drain is closed. It will therefore be seen that should the gauge glass be broken, the oil can be drained therefrom without necessitating the drainage of the oil from the journal box oil receptacle, and the glass can immediately be replaced.

A wrench applied to the small hexagonal nut at the top of the gauge, makes it possible to remove the gauge glass, as it and the shield are simply held in place by a rod running through the center of the gauge and screwed into the key.

PRICE LIST.

Size, Shank Pipe Thread,	1/8	1/4	3/8	1/2
Height from Center of Shank to Top of Gauge,.....inches	2 7/8	3 1/4	3 3/4	4 1/4
Length of Shank from Center of Gauge Glass,.....inches	1 3/4	1 3/4	2 1/8	4 1/8
Length of Glass, inches	1 1/8	2 1/8	2 3/4	3 1/8
Finished Brass, each	90	1 00	1 15	1 60
Nickel Plated, each	1 10	1 20	1 35	1 80

LUNKENHEIMER

OIL GAUGES WITH REVOLUBLE SHIELD.

Patented.



Fig. 528. Plain.



Fig. 529. With Drain Cock.

Although not possessing all the advantages of the "Triplex" the above is far superior to the large variety of common grades on the market.

It is a lower-priced gauge than that shown on page 344, but is as carefully made, and is simple and practical in construction, can be easily taken apart and is handsome in appearance.

The glass protecting shield is a slotted tube which permits being revolved around the glass tube; thus it can easily be kept clean and the shield set in proper position with regard to the light, so that the oil is plainly visible. The entire gauge is held together by a thin wire rod, which is screwed into the bottom fitting, passes through the center of glass tube, and has a nut fastened to it on the upper side of top cover. To clean the glass tube, hold a piece of waste to the tube and revolve it with the shield around the glass until properly cleaned, then turn the shield to its former position.

PRICE LIST.

Size, Shank Pipe Thread.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
Height from center of square to top of Gauge.....inches	2 $\frac{5}{8}$	3 $\frac{1}{8}$	3 $\frac{3}{8}$	4 $\frac{1}{8}$
Length of shank from center of square.....inches	1 $\frac{5}{8}$	1 $\frac{3}{4}$	2 $\frac{1}{8}$	4 $\frac{1}{8}$
Length of Glass.....inches	2 $\frac{1}{2}$	2 $\frac{3}{8}$	3 $\frac{1}{8}$	4 $\frac{1}{8}$
Finished Brass without Drain Cock.....each	40	50	65	1 00
Nickel Plated without Drain Cock.....each	55	65	80	1 20
Finished Brass with Drain Cock.....each	80	90	1 05	1 40
Nickel Plated with Drain Cock.....each	1 00	1 10	1 25	1 65

In ordering Oil Gauges always state whether wanted with or without Drain Cock and if Finished Brass or Nickel Plated. When not specified, gauges will be sent Finished Brass with Drain Cock.

When gauges are ordered whose dimensions are different from the above an extra charge will be made, same varying according to number of gauges ordered and amount of difference from our standard of dimensions. Orders stating simply Oil Gauges will be filled with the above.

LUNKENHEIMER
GRAVITY TYPE MULTIPLE OILER.

Fig. 667

This style of oiler was originally designed and adapted for use on high-speed vertical engines, but has been found useful for all places where it is desirable to oil a number of bearings from one reservoir situated in a convenient place. The sight feeds are provided with our "Sentinel" style of oil-regulating device, which can be quickly adjusted to give any desired flow of oil, and feed can be put on or off by simply raising or lowering cam lever at top. We are prepared to furnish devices of this kind of any desired capacity and number of sight feeds. Unions at bottom of sight feeds can be furnished threaded, either male or female, or plain, for brazing. In ordering always state capacity of reservoir required, give the number of sight feeds, and whether unions on same are to be threaded, or left plain for brazing. If unions are to be threaded, state thread desired, and if for brazing give outside diameter of pipe. Unions with larger thread than $\frac{1}{4}$ -inch pipe will be charged extra. Unless otherwise ordered unions are furnished threaded for $\frac{1}{8}$ -inch pipe.

The list prices herewith cover the round-body device, as shown in cut. To find list for any size of oiler and number of sight feeds, proceed as follows: Multiply the list price of sight feeds for size of reservoir required by the number of same, and add this amount to the list price of the reservoir, and, if brackets are required, add these also, and the sum of the three items will be the complete list price, subject to discount. See page 307 for Pressure Type Multiple Oiler.

PRICE LIST.

Capacity,	1 Pt.	1 Qt.	$\frac{1}{2}$ Gal.	1 Gal.	2 Gal.	3 Gal.
Reservoirs, Finished Brass,.....each	8 40	11 60	15 00	20 00	26 60	36 60
Reservoirs, Nickel Plated, .....each	9 70	13 70	17 30	22 60	29 70	40 00
Sight Feeds, Finished Brass,.....each	1 35	1 40	1 50	1 55	1 60	1 70
Sight Feeds, Nickel Plated, .....each	1 55	1 60	1 70	1 75	1 80	1 90
Brackets for supporting Reservoir, Finished Brass,.....per pair	1 35	1 70	2 00	2 35	2 70	3 30
Brackets for supporting Reservoir, Nickel Plated, .....per pair	1 50	1 90	2 35	2 70	3 15	4 00

All genuine Multiple Oilers have the name LUNKENHEIMER on them.

SECTION XII.

GREASE CUPS.

LUNKENHEIMER**GREASE CUPS.**

The sharp struggle among other manufacturers of Grease Cups for commercial supremacy has been such in the past years that more attention has been paid among them to the production of the cheapest article than to the quality of same. The result, however, is only too well known among users of such cheap articles, and we sincerely trust that by this time they have fully realized that the installation of a good, practical and durable device will prove itself to be the cheapest in the end, and will save considerable time and annoyance.

It is, and has always been, our endeavor to furnish the trade with only the very highest grade of goods, and judging from our large sales and the general satisfaction derived from the use of our products we have certainly accomplished our aim.

On the following pages are illustrated and described a complete line of our Grease Cups, among which we feel assured the trade will find exactly what they require, both as to design and adaption to the particular use for which the Grease Cup is desired.

As regards price, we are enabled to suit the requirements of the trade in this respect, but, no matter how low the price may be, the quality, workmanship and design of all our Grease Cups are well in keeping with our other high-grade products.

Our Automatic Compression Grease Cups are all furnished with a feed regulating device, by means of which the cup is very economical in operation, and one filling can be so regulated as to last a long time.

All parts about our cups are made very strong and durable, and are guaranteed in every respect. Each and every one is thoroughly tested and inspected before shipment, and perfect satisfaction is warranted.

NOTE:—We are frequently requested to furnish Grease Cups with smaller size pipe threaded shanks than those usually furnished. While we will comply with the requirements, nevertheless we do not guarantee the cups, as they are liable to break off at the shank.

The name LUNKENHEIMER is on every one of our Grease Cups. None genuine without it.

LUNKENHEIMER "IDEAL" AUTOMATIC GREASE CUP.

For Engine Crank Pins, Journals, Etc.



Exterior.



Sectional.

Fig. 510.

The "Ideal" is a first-class, cast brass, highly finished, automatic compression cup, suitable for engine bearings, journals, etc. It is provided with a leather packed plunger (insuring a tight joint and smooth working), which is so constructed that it is easily raised when cup requires recharging with grease. The spring and plunger are conveniently controlled by thumb-nut A, which is provided with an automatic lock arrangement to prevent its jarring from position on stem. The hole through the shank can be regulated to suit the grease used, by means of regulating screw H. As a high grade cup of superior design and perfect regulation of feed, the "Ideal" has no equal.

For special requirements we are prepared to furnish larger sizes than those listed below. Prices on application.

DIRECTIONS.

Turn thumb-nut A to the right until plunger is drawn to the top of cup; then unscrew cover and fill cup with grease. Replace cover and adjust pressure on grease by screwing up thumb-nut A to top of stem B, thereby allowing plunger to compress and feed the grease.

The rate of feed must be regulated by set-screw H, which has a hole through it in line with the slot in the head of same; thus it is regulated like a stop cock.

If it is desired to stop the flow of grease, turn thumb-nut A down to cover, thereby taking tension off spring.

PRICE LIST.

Number.....	00	0	1	2	3	4	5
Inside Diameter.....inches	$\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$
Extreme Outside Diameter.....inches	$1\frac{3}{8}$	$1\frac{3}{4}$	2	$2\frac{5}{8}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$4\frac{1}{4}$
Extreme Height Over All (Plunger raised—Cup open).....inches	$3\frac{3}{4}$	$4\frac{5}{8}$	$5\frac{1}{4}$	$6\frac{1}{4}$	$7\frac{1}{2}$	$8\frac{3}{4}$	$9\frac{1}{4}$
Shank Pipe Thread.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
Capacity (Grease).....ounces	$\frac{1}{8}$	1	$1\frac{1}{2}$	3	6	10	18
Finished Brass.....each	1 50	2 00	2 50	3 20	4 30	6 00	12 50
Nickel Plated.....each	1 75	2 25	2 80	3 60	5 00	6 75	13 80

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

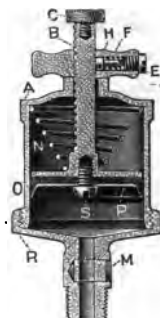
"LION" AUTOMATIC GREASE CUP.

For All Kinds of Machinery Bearings.



Exterior.

Fig. 824.



Sectional.

The "Lion" is a heavy, substantial, cast brass, highly finished grease cup, and as now constructed, fulfills in every respect the requirements for an automatic cup. The construction is similar to the "Ideal" inasmuch as it has a leather-packed plunger (insuring a tight fit and smooth working), simple feed adjustment and spring dog attachment to prevent the feed from being cut off by the machinery jarring the thumb-nut D. The feed of grease is adjusted by the feed screw M in base.

If it is desired to stop the flow of grease, turn thumb-nut (D) down to cover. All parts about the cup are heavy and substantial and it is consequently very durable. The spring is strong enough to feed the heaviest kind of grease, and the feed screw in the base can be adjusted to deliver any required amount to the bearing. All parts about the cup are made on the interchangeable plan so that any worn-out or broken piece can be easily replaced at slight expense.

PRICE LIST.

Number.....	00	0	1	2	3	4
Inside Diameter, .....inches	$\frac{7}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	$2\frac{3}{4}$
Extreme Outside Diameter.....inches	$1\frac{1}{4}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{4}$
Extreme Height over all (plunger raised, cup open) ..in.	$3\frac{1}{2}$	$4\frac{1}{4}$	5	$6\frac{1}{4}$	$7\frac{1}{4}$	$8\frac{1}{4}$
Shank Pipe Thread,.....inch	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{5}{8}$	$\frac{1}{2}$	$\frac{3}{8}$
Capacity (Grease).....ounces	$\frac{1}{2}$	1	$1\frac{1}{2}$	3	6	10
Finished Brass,.....each	1 50	2 00	2 50	3 20	4 30	6 00
Nickel Plated,.....each	1 75	2 25	2 80	3 60	5 00	6 75

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"JEWEL" AUTOMATIC GREASE CUP.

For Bearings, Shafting, Loose Pulleys, Etc.



Exterior.



Sectional.

Fig. 511.

The "Jewel" Grease Cup we have designed to meet the demand for a simple and inexpensive automatic cup and to take the place of iron cups. The base is of cast brass, while the top is of tubing and spun brass. This cup will be found far superior to iron cups, although the price is about the same. They are of brass throughout, provided with leather-packed plunger, are of neat design, well made and light in weight.

DIRECTIONS.

When cup is empty, and plunger is at bottom of same, unscrew and take off the reservoir, then screw the plunger to top of reservoir by means of the thumb-nut. Then fill the reservoir with grease, and, after screwing it back to its base, screw the thumb-nut up to the top of the plunger so as to put the pressure of the spring on the grease. The base of the cup is provided with a simple feed-regulating screw adjustable to suit any kind of grease.

PRICE LIST.

Number,	00	0	1	2	3	4
Inside Diameter,.....inches	$\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
Extreme Outside Diameter,.....inches	$1\frac{1}{8}$	$1\frac{3}{4}$	2	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{3}{8}$
Extreme Height over all (plunger raised—cup open),...in.	$3\frac{3}{8}$	$3\frac{1}{2}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{3}{8}$	$8\frac{1}{8}$
Shank Pipe Thread,.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$
Capacity (Grease),.....ounces	$\frac{1}{2}$	1	$1\frac{1}{2}$	3	6	10
Finished Brass,.....each	80	1 00	1 30	1 70	2 30	3 20
Nickel Plated,.....each	1 00	1 30	1 70	2 20	2 90	3 90

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
SCREW FEED "MARINE" GREASE CUP.



Exterior.



Sectional.

Fig. 512.

This cup is more particularly designed for Marine Engines, but will also be found suitable for many other purposes where a screw feed is desired, or it is necessary to force the grease some distance to the parts to be lubricated.

The body of this Cup is made very heavy in order to withstand rough usage, and we guarantee it to be a thoroughly substantial article in every way.

For special requirements we are prepared to furnish larger sizes than those listed below. Prices on application.

PRICE LIST.

Number,	00	0	1	2	3	4	5
Inside Diameter,.....inches	$\frac{3}{8}$	$1\frac{1}{4}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{4}$
Extreme Outside Diameter,.....inches	$1\frac{1}{4}$	$1\frac{3}{4}$	2	$2\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$
Extreme Height over all (plunger raised—cup open),.....inches	$3\frac{1}{8}$	$4\frac{1}{2}$	$5\frac{1}{8}$	$6\frac{1}{4}$	$7\frac{1}{8}$	$8\frac{1}{4}$	$10\frac{1}{4}$
Shank Pipe Thread,.....inch	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
Capacity (Grease),.....ounces	$\frac{1}{2}$	1	$1\frac{1}{2}$	3	6	10	18
Finished Brass,.....each	1 00	1 20	1 60	2 00	2 80	4 00	7 00
Nickel Plated,.....each	1 20	1 45	1 90	2 40	3 40	4 75	8 20

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"TIGER" PLAIN BRASS GREASE CUP.



Fig. 513.



Sectional.

The Lunkenger "Tiger" Plain Grease Cup is a cast brass cup, well adapted for jarring machinery, and is unsurpassed where a simple, compact and efficient plain cup is required. By screwing down cap (A) the lubricant is forced to the bearing. The leather washer (H) prevents the grease from leaking out of cup, and can be easily replaced when worn out; spring lock arrangement (B), the projection (E) of which engages (K) at each turn, prevents the cap from jarring off, also cuts and loosens the grease.

Always keep leather washer (H) well expanded against the thread in cap by screwing up plate (C). This plate can easily be tightened or unscrewed by using a pointed tool, inserting it in one of the holes in plate and striking it with a hammer.

These cups are furnished in three styles, viz.: Finished Brass, Nickel Plated or Rough. See price list below.

When no style is mentioned, orders will be filled with Finished Brass, same as shown in cut.

PRICE LIST.

Number,.....	00	0	1	2	3	4
Inside Diameter,.....inches	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$2\frac{3}{8}$	$2\frac{1}{2}$
Extreme Outside Diameter, Finished Pattern,.....inches	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$
Extreme Height over all (cup open), Finished Pattern, in.	$1\frac{1}{4}$	2	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$	$3\frac{1}{4}$
Extreme Outside Diameter, Rough Pattern,.....inches	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$2\frac{1}{8}$	$2\frac{1}{2}$	$3\frac{3}{8}$
Extreme Height over all (cup open), Rough Pattern, in.	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$3\frac{3}{8}$
Shank Pipe Thread,.....inch	$\frac{7}{8}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Capacity (Grease),.....ounces	$\frac{1}{2}$	$\frac{3}{4}$	1	2	$3\frac{1}{2}$	5
Finished Brass,.....each	70	90	1 15	1 50	2 15	2 90
Finished Brass Nickel Plated,.....each	81	1 06	1 36	1 80	2 60	3 40
Rough Brass,.....each	56	74	96	1 28	1 76	2 30

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"GEM" PLAIN BRASS GREASE CUP.



Fig. 556.

The Lunkenheim "Gem" Plain Grease Cup has been produced to meet the demand for a low-priced, all-finished brass cup. It is well made and will be found superior to iron cups.

PRICE LIST.

Number	00	0	1	2	3	4
Inside Diameter,.....inches	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$2\frac{1}{8}$	$2\frac{3}{8}$
Extreme Outside Diameter,.....inches	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{5}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$
Extreme Height over all (cup open),..inches	$1\frac{3}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{5}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$
Shank Pipe Thread,.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
Capacity (Grease),.....ounces	$\frac{1}{4}$	$\frac{3}{8}$	1	2	$3\frac{1}{2}$	5
Finished Brass,.....each	70	90	1 15	1 50	2 15	2 90
Nickel Plated, .....each	80	1 00	1 30	1 70	2 45	3 20
Rough Brass,.....each	56	74	96	1 28	1 76	2 30

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

"POSITIVE" AND "SURETY" GREASE CUPS.

With Wing Handle on Cap.



Fig. 967.
"Positive."



Fig. 968.
"Surety."

To facilitate the operation of Lunkensheimer Plain Brass Grease Cups we have designed the same with wing handles on the caps, as shown in cuts above. The "Positive" is similar to the "Tiger" shown on page 353, while the "Surety" is like the "Gem" seen on page 354, and by referring to these pages a general description of the above can be obtained.

PRICE LIST.

Size,..... number	00	0	1	2	3	4
"Positive," Finished Brass, .....each	85	1 05	1 35	1 80	2 40	3 60
"Surety," Finished Brass, each	85	1 05	1 35	1 80	2 40	3 60
Inside Diameter, "Positive," inches	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$2\frac{1}{8}$	$2\frac{3}{8}$
Extreme Outside Diameter, "Positive," .....inches	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{11}{16}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$
Shank Pipe Thread, "Positive," .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Capacity (Grease), "Positive," ounces	$\frac{1}{2}$	$\frac{3}{4}$	1	2	$3\frac{1}{2}$	5
Inside Diameter, "Surety," .....inches	$\frac{3}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$2\frac{1}{8}$	$2\frac{3}{8}$
Extreme Outside Diameter, "Surety," .....inches	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{11}{16}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{4}$
Shank Pipe Thread, "Surety," .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$
Capacity (Grease), "Surety," ounces	$\frac{1}{2}$	$\frac{3}{4}$	1	2	$3\frac{1}{2}$	5

All genuine Grease Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"REX" SPUN-TOP PLAIN BRASS GREASE CUP.



Fig. 514.

This simple and inexpensive Grease Cup will be found equal to more expensive plain cups for various purposes. The top is of spun brass, and, although being very light in weight (so as not to jar off), is quite strong; *the base is made of cast brass.*

PRICE LIST.

Number,.....	6	7	8	9
Inside Diameter,.....inches	1 $\frac{1}{8}$	1 $\frac{3}{8}$	2 $\frac{1}{8}$	2 $\frac{3}{8}$
Extreme Outside Diameter,.....inches	1 $\frac{1}{2}$	1 $\frac{7}{8}$	2 $\frac{1}{8}$	2 $\frac{3}{8}$
Extreme Height over all (cap open),.....inches	2 $\frac{3}{8}$	2 $\frac{1}{2}$	2 $\frac{1}{8}$	3
Shank Pipe Thread,.....inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$
Capacity (Grease),.....ounces	$\frac{3}{8}$	1 $\frac{1}{2}$	3 $\frac{1}{2}$	5
Brass,.....each	55	70	90	1 20

All genuine Grease Cups have the name LUNKENHEIMER stamped on them.

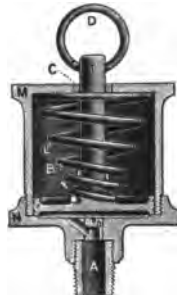
LUNKENHEIMER

“APOLLO” COMPRESSION IRON GREASE CUP.

For Bearings, Shaftings, Etc.



Exterior.



Sectional.

Fig. 669.

The “Apollo” Compression Iron Grease Cup is heavy, and designed for use in all places where the finish of the article used is not important. It works well on Shafting, Pulleys and all Bearings, and will feed from any direction. The threaded shank consists of a common pipe nipple inserted in base of cup, which can easily be replaced if broken.

TO FILL:—Raise plunger by means of ring at top of same and lock plunger stem over top of cup by means of lugs on sides of stem. Remove cover, fill with grease, regulate feed by screw in base, replace cover and put pressure on grease by unlocking stem lugs from hole in cover.

This cup is very economical in operation, and one filling can be so regulated as to last a long time. Each cup fully guaranteed.

PRICE LIST.

Number,	1	2	3	4
Inside Diameter, .....inches	1½	2	2½	3
Shank Pipe Thread, .....inch	¾	¾	¾	¾
Capacity (Grease), .....ounces	1½	3	6	10
Iron, .....each	1 50	1 70	2 30	3 20

All genuine Grease Cups have the name LUNKENHEIMER stamped on them.

LUNKENHEIMER

PLAIN STEEL GREASE CUP.



Fig. 870.

The above cup is made of steel (not cast iron) drawn to shape, is extremely strong and durable, and should last indefinitely. It is well made and for an inexpensive plain grease cup has no equal.

PRICE LIST.

Size, number	00	0	1	2	3	4
Inside Diameter, inches	1	1 1/4	1 1/2	2	2 1/2	3
Shank Pipe Thread, inch	3/8	1/2	3/4	1	1 1/4	1 1/2
Capacity (Grease), ounces	1/2	3/4	1	2	3 1/2	5
Rough Steel, each	25	35	45	55	80	1 05

All genuine Grease Cups have the name LUNKENHEIMER on same.

SECTION XIII.

OIL CUPS.

LUNKENHEIMER**OIL CUPS.**

We fully appreciate the requirements of the trade with regard to Oil Cups having manufactured them for upwards of half a century, and are unquestionably in a better position to comply with requirements than any other manufacturer of similar articles.

Endless trouble, expense, time, and often serious accidents are caused by the imperfect lubrication of bearings, etc., all due to the oil cup used. The Lunkenheimer Oil Cups are not experiments, but are positive, strong, durable and reliable devices, and are universally acknowledged as superior articles. They are well made, present an elegant appearance, and will not shake to pieces when placed on jarring machinery.

A perusal of this section will acquaint the trade with the large variety of Oil Cups manufactured by us, and we believe no trouble will be had in finding a cup of the desired design.

Each and every one of our Oil Cups are carefully inspected and tested, and are guaranteed in every respect.

NOTE:—We are frequently requested to make the pipe threaded shank one size smaller than that usually furnished. While we will comply with this request, nevertheless we strongly recommend that they are not so ordered, as this weakens the shanks, and they are liable to break off either while attaching or while in use, if they are in the least roughly handled. Cups furnished as above will not be guaranteed by us.

The name LUNKENHEIMER is stamped on every article, otherwise the same is not genuine.

LUNKENHEIMER "PIONEER" SLIDE TOP GLASS OIL CUP.



Fig. 515.

The "Pioneer" Oil Cups have become an "acknowledged standard," being by far the best designed and constructed, and consequently the most perfect oilers of their class, and are adapted for all engine and machinery bearings where it is desirable to use a first-class cup. They are made of cast brass (not spun brass), are highly finished, compact, and very ornamental. These, and the other styles of glass oil cups manufactured by us, are the only ones on the market which will not come apart when placed on jarring machinery, neither will the feed unset nor slide loosen, thereby spilling the oil. These excellent features, being exclusive with our cups and covered by patents, give them a very considerable prestige over all other makes. They are easily filled and regulated, and are satisfactory to users in every respect. They are especially adapted for Traction Engines, Steam Rollers and other machinery of like character, where it is necessary to use a durable and substantial oiler.

PRICE LIST.

Number,	000	00	0	1	1½	2	3	4	5	6	8
Extreme Outside Diameter of Cup, ..inches	1½	1¾	1½	1¾	2	2½	2¾	3¼	3½	3¾	4¾
Extreme Height of Cup (over all), ..inches	2½	2¾	3¾	3¾	4¾	4¾	4¾	5¾	6	7¾	8¾
Outside Diameter of Glass, ..inches	1	1½	1¾	1½	1¾	2	2¼	2½	3	3½	4¼
Height of Glass, ..inches	¾	1	1¼	1¾	1¾	1¾	2¾	2¾	3	4	5
Capacity, ..ounces	¼	½	¾	1	1½	2½	4	5	10	18	34
Shank Pipe Thread, ..inch	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
Finished Brass, ..each	70	75	80	1 00	1 25	1 50	1 90	2 40	3 10	4 00	8 50
Nickel Plated, ..each	80	85	95	1 20	1 50	1 75	2 20	2 75	3 50	4 50	9 50

To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"VICTOR" INDEX GLASS OIL CUP.



Fig. 516.

The Lunkenheim "Victor" Index Glass Oil Cup is provided with a simple "index" device for regulating the feed of oil, and has an indicator arm pivoted on the stem and turning on the lid to mark the notch giving the desired rate of feed. The feed can be instantly turned off and on again by replacing the lever in the notch of the indicator arm. When the index arm is closed the lever can be left to stand up out of the notch, thus acting as an indicator, to show from a distance that the feed is shut off. This cup is exactly like the "Crown" on page 364, but without sight feed.

PRICE LIST.

Number,.....	0	1	1½	2	3	4	5	6	8
Extreme Outside Diameter of Cup (lever included), .....inches	2½	2½	2½	3¼	3¼	4	4½	5¼	6¼
Extreme Height of Cup (over all),.....inches	3½	4½	4½	5¼	6	6½	7½	8¼	9¼
Outside Diameter of Glass,.....inches	1¼	1½	1¾	2	2¼	2½	3	3¼	4¼
Height of Glass,.....inches	1½	1¾	1¾	1¾	2½	2¾	3	4	5
Capacity,.....ounces	¾	1	1½	2½	4	5	10	18	34
Shank Pipe Thread,.....in.	¾	¾	¾	¾	¾	¾	¾	¾	¾
Finished Brass,.....each	1 00	1 20	1 45	1 75	2 15	2 70	3 40	4 30	9 25
Nickel Plated,.....each	1 15	1 40	1 70	2 00	2 45	3 05	3 80	4 80	10 25

To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
"SENTINEL" SNAP LEVER SIGHT-FEED
GLASS OIL CUP.

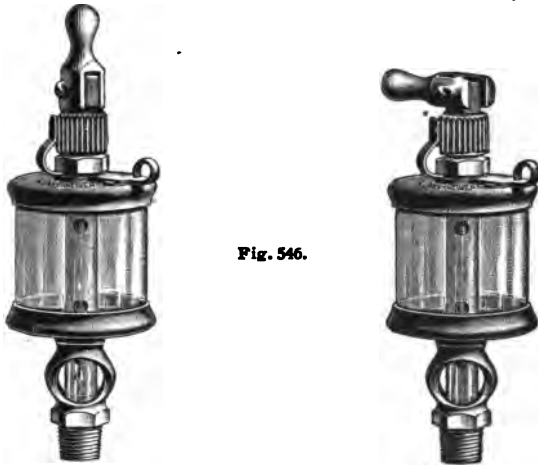


Fig. 546.

Lever up, cup feeding.

Lever down, feed stopped.

The Lunkenheim "Sentinel" Snap-Lever Sight-Feed Glass Oil Cup, as will be seen from the illustration above, is handsome and ornamental in appearance and thoroughly strong and substantial in construction. It is simple in operation, compact, well made, and not liable to get out of order, as is the case with other makes. We have dispensed with complicated lock-nut feed regulating devices and use a simple arrangement by means of which the feed is easily and securely adjusted. Owing to its construction, the cup will not shake to pieces when placed on jarring machinery; neither will the feed unset when either raising or lowering lever, as the curved spring which presses against the milled regulating nut prevents it from turning.

Another advantage it has is that, when set to feed a given amount of oil, it will hold up its rate of feed until cup is entirely emptied. Great care is taken in the manufacture of these cups, and we warrant them to be first class in every particular, and unequalled for durability, efficiency and reliability.

DIRECTIONS TO SET FEED:—Raise the lever and turn the milled thumb-nut until the desired feed is obtained. The feed can be shut off by lowering the lever. When the lever is set at an angle of 45 degrees it raises the feed stem clear off its seat and cup flushes.

PRICE LIST.

Number.....	0	1	1½	2	3	4	5	6	8
Extreme Outside Diameter of Cup.....Inches	1½	1¾	2	2¼	2½	2¾	3¼	3¾	4½
Extreme Height of Cup over all (lever up).....Inches	5¼	5½	5¾	6¼	6½	7½	8½	9	11
Outside Diameter of Glass.....Inches	1¼	1½	1¾	2	2¼	2½	3	3¾	4¼
Height of Glass.....Inches	1½	1¾	1½	1¾	2¾	2¾	3	4	5
Capacity.....Ounces	¾	1	1½	2½	4	5	10	18	34
Shank Pipe Thread.....Inch	¾	¾	¾	¾	¾	¾	¾	¾	¾
Finished Brass.....each	3 00	3 25	3 50	3 75	4 25	5 25	7 25	9 25	20 00
Nickel Plated.....each	3 50	3 75	4 00	4 25	4 75	5 75	8 00	10 25	22 00

To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"CROWN" INDEX SIGHT-FEED GLASS OIL CUP.



Fig. 518.

The Lunkenheimer "Crown" Index Sight-Feed Glass Oil Cup is of first-class quality throughout, very ornamental in appearance and made of cast brass. It has an "index" device for regulating the feed of oil, and an indicator arm turning on the lid to mark the notch giving the desired feed. The feed can be instantly turned off and on again by replacing the index lever in the notch of the indicator arm. When the feed is shut off, the lever can be left to stand up out of the notch, thus acting as an indicator to show from a distance that the feed is shut off. It fulfills all the requirements for dynamo and engine use, and we recommend it where a first-class substantial cup is wanted.

PRICE LIST.

Number,.....	0	1	1½	2	3	4	5	6	8
Extrem. Outside Diameter of Cup (lever included),... inches	2½	2½	2½	3¼	3¼	4	4½	5¼	6¼
Extreme Height of Cup (over all), inches	4½	5½	5½	6	6½	7½	8¼	9¼	10¾
Outside Diameter of Glass,....inches	1½	1½	1¾	2	2¼	2½	3	3½	4¼
Height of Glass,.....inches	1½	1½	1½	1½	2½	2½	3	4	5
Capacity,.....ounces	¾	1	1½	2½	4	5	10	18	34
Shank Pipe Thread,.....inch	½	¾	¾	¾	¾	¾	¾	¾	¾
Finished Brass,.....each	1 25	1 50	1 75	2 10	2 55	3 15	3 90	4 80	10 00
Nickel Plated,.....each	1 40	1 70	2 00	2 35	2 85	3 50	4 30	5 30	12 00

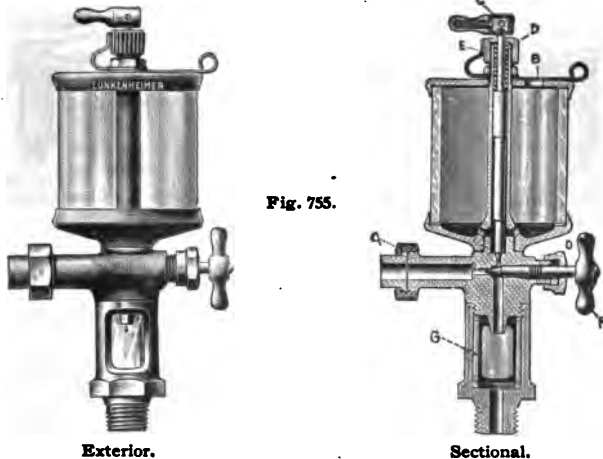
To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
"RESERVE" PRESSURE OIL CUP.

PATENTED



The Pattern of Pressure Oil Cup shown above contains a number of improvements over all other forms of cups heretofore used on pressure oiling systems. In all other makes of cups the glass cylinder or reservoir must be kept constantly under pressure, and, in case of breakage of same, considerable oil is lost and cup is rendered useless. Another bad feature of the old style of construction is that on account of the large diameter of the glass cylinder, if the pressure on the oil supply is anyways considerable, it is difficult to keep the joints from leaking.

In the new form of cup, shown above, the glass reservoir is not under pressure whatever, but, instead, the oil supply is piped through the union (A) in base, the opening of which into the oil duct leading to the bearing is controlled by oil regulating valve (F). The auxiliary supply is regulated by the oil valve (C).

The advantages of this construction in Pressure Oil Cups are obvious in comparisons made with other styles. With this improved cup, it is always easy to regulate the supply of oil under pressure, and, when it is desirable to cut same off, the valve (F) can be closed. The regulation of this valve is very simple and easily effected, and, when once set, is not disturbed by the jarring of the machinery. The sight-feed in the base is very long and large in diameter, and the drops of oil can be plainly seen from a distance. The auxiliary oiler (which is intended to be used in case the pressure supply should be discontinued or cut off) consists of our standard pattern "Sentinel" Oil Cup, the feeding of oil being regulated by the cam lever (C), which dispenses with the screw plugs used in other makes.

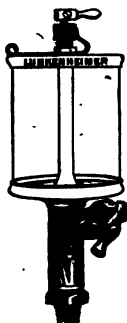
"Reserve" Pressure Oil Cup.—Continued.

Fig. 284.
Angle Connection,
Right Hand.

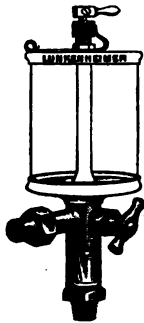


Fig. 283.
Angle Connection,
Left Hand.

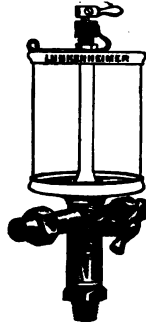


Fig. 280.
Cross Connection.

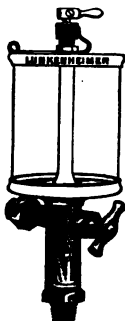


Fig. 755.
Straight Connection.



Fig. 282.
Corner Connection,
Right Hand.

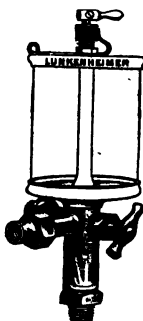


Fig. 281.
Corner Connection,
Left Hand.

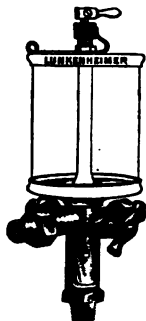


Fig. 279.
Three-Way Connection.

"Reserve" Pressure Oil Cup.—Continued.

Where it is necessary to place a gang of three or more cups on large bearings, we can supply them arranged so as to obviate the necessity of intermediate piping. Full particulars and sketches furnished upon application.

To facilitate piping, we can supply our Pressure Oil Cups with any of the bases shown on opposite page, and by reference thereto the location of the various connections will be readily understood.

All parts about this cup are made of cast (not spun) brass. It is a heavy, substantial and durable device, simple in operation and practical in its applications.

When ordering be sure to give the figure number. Unless otherwise ordered, figure 755 will be sent.

See pages 342 and 343 for price list of bases, which can be used in connection with any style of oil cup.

PRICE LIST.

Size,.....number	4	5	6	8
Fig. 755, Straight Connection, with Cup, Finished Brass, each	4 00	5 40	7 00	14 00
Fig. 755, Straight Connection, with Cup, Nickel Plated,.....each	4 60	6 20	8 20	16 40
Figs. 284 and 283, Angle Connection, Right and Left Hand Patterns, with Cup, Finished Brass,.....each	4 40	6 00	8 30	15 50
Figs. 284 and 283, Angle Connection, Right and Left Hand Patterns, with Cup, Nickel Plated,.....each	5 00	6 90	9 40	17 90
Figs. 282 and 281, Corner Connection, Right and Left Hand Patterns, with Cup, Finished Brass,.....each	6 00	7 80	9 70	17 30
Figs. 282 and 281, Corner Connection, Right and Left Hand Patterns, with Cup, Nickel Plated,.....each	6 60	8 60	10 90	19 70
Fig. 280, Cross Connection, with Cup, Finished Brass,.....each	5 80	7 40	9 30	16 80
Fig. 280, Cross Connection, with Cup, Nickel Plated,.....each	6 40	8 20	10 50	19 20
Fig. 279, Three-Way Connection, with Cup, Finished Brass,.....each	6 80	8 50	10 80	19 00
Fig. 279, Three-Way Connection, with Cup, Nickel Plated,.....each	7 40	9 40	12 00	21 40

In ordering extra glasses and cork washers, always specify name and size number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

Dimensions on application.

All genuine Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

"ROYAL" SIGHT-FEED GLASS OIL CUP.



Fig. 517.

The Lunkenheimer "Royal" Sight-Feed Glass Oil Cup will be found an excellent cup for engine and dynamo use. It is simple and practical, and so constructed that when the desired feed is once set it can be stopped and started at will without resetting, the spring acting as a lock and indicator when engaging the flattened side of the thumb-nut.

DIRECTIONS TO SET FEED:—Regulate the feed by turning the milled cover, so that when the flattened side of thumb-nut engages the spring the desired feed is obtained. When the feed is once established it can instantly be shut off or put on by turning the milled thumb-nut, *i. e.*, to the right, feed off; to the left, feed on.

PRICE LIST.

Number.....	000	00	0	1	1½	2	3	4	5	6	8
Extreme Outside Diameter of Cup,.....inches	1½	1½	1½	1½	2½	2½	2½	2½	3½	3½	4½
Extreme Height of Cup (over all),.....inches	3	3½	3½	4½	4½	4½	5½	6	6½	7½	9
Outside Diameter of Glass,.....inches	1	1½	1½	1½	1½	2	2½	2½	3	3½	4½
Height of Glass,.....inches	¾	1	1½	1½	1½	1½	2½	2½	3	4	5
Capacity,.....ounces	¾	¾	¾	1	1½	2½	4	5	10	18	34
Shank Pipe Thread,.....inch	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
Finished Brass,.....each	95	1 10	1 25	1 50	1 75	2 10	2 55	3 15	3 90	4 80	10 00
Nickel Plated,.....each	1 05	1 20	1 40	1 70	2 00	2 35	2 85	3 50	4 30	5 30	12 00

To avoid mistakes when ordering glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
"MIAMI" PLAIN GLASS OIL CUP.
With Screw Cap.



Fig. 525.

This simple and substantial air-tight Oil Cup will be found suitable for stationary and movable bearings. It will not leak when placed on movable bearings, has a simple feed regulating arrangement and an improved screw filler enabling convenient and quick refilling. The filling cap, being made of a very thin and light material, is easily screwed tight without the use of a wrench, and will not jar off. When feed is once set the cup operates automatically and regularly, and stops feeding when the machinery is not in motion.

PRICE LIST.

Number.....	000	00	0	1	1½	2	3	4	5	6
Extreme Outside Diameter of Cup.....inches	1½	1¾	1½	1¾	2	2¼	2½	2¾	3½	4
Extreme Height of Cup (plug raised, open to fill).....inches	2½	3½	3½	4	4½	4½	5	5½	6½	7½
Outside Diameter of Glass.....inches	1	1½	1¾	1¾	1¾	2	2¼	2½	3	3½
Height of Glass.....inches	¾	1	1½	1¾	1¾	1¾	2¼	2½	3	4
Capacity.....ounces	¾	¾	¾	1	1½	2½	4	5	10	18
Shank Pipe Thread.....inch	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
Finished Brass.....each	70	75	80	1 00	1 25	1 50	1 90	2 40	3 10	4 00
Nickel Plated.....each	80	85	95	1 20	1 50	1 75	2 20	2 75	3 50	4 50

Cups of this style will be furnished with loose wire feed if desired.

To avoid mistakes when ordering extra glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER**"CHAMPION" ROD OIL CUP.****Suitable for All Movable Bearings.****Fig. 591.****Sectional View.****Showing Interior Construction.**

Our efforts towards producing a perfect oiler for movable bearings have evolved the "Champion" Cup, which is constructed on lines radically different from anything heretofore designed for this purpose. The difference we refer to is the peculiar shape of the body part of cup, which, as will be seen from the illustration above, is round.

The construction of this cup is simple, the round body having a window on each side of same to enable the engineer to see the height of oil in cup. The feeding arrangement consists of a tube, screwed into the base of the cup and communicating with the oil hole in the shank. Secured to the top of this tube is a regulating valve, by which means any quantity of oil can be fed through the tube. The oil duct is large and straight, and it is easy to keep the cup clean and free from impurities which may be in the oil.

"Champion" Rod Oil Cup—Continued.

The operation of this cup will be readily understood when reference is made to the illustrations. The cup having been filled with oil as soon as it is put in motion, the oil begins to travel in a body within the cup and at each revolution of cup is thrown against the feeding apparatus and flows down through it to the bearing. Thus it will be obvious that no matter how little oil there may be in the cup, the centrifugal force, combined with the shape of the body, will carry it to the holes in the feed tube.

Care should be taken in attaching the cup, so that the circular body of same is placed that it travels in the same direction as the bearing and the glass sides are parallel with the rod. After the cup is once regulated it requires no further attention other than filling. This cup will not throw oil and feeds only while machinery is in motion. It is well made of cast brass, neat in appearance, and broken glasses can be easily renewed at slight expense.

We solicit from users a trial of this ingenious cup, and can guarantee it to be the simplest and most economical oiler for movable bearings now on the market.

PRICE LIST.

Number,.....	1	2	3	3½	4
Finished Brass,.....each	1 40	2 00	2 60	3 50	4 00
Nickel Plated,.....each	1 50	2 20	2 80	3 85	4 40
Capacity,.....ounces	1½	2½	5	8	12
Outside Diameter,.....inches	2	2½	3	3½	4
Height of Cup (closed),.....inches	3½	3½	4½	5½	5½
Height of Cup (open to fill),.....inches	4½	4½	5½	6½	7½
Width,.....inches	1½	1½	2½	2½	2½
Shank Pipe Thread.....inch	¾	¾	½	½	¾
Glasses,.....each	05	08	10	12	15
Corks,.....per dozen	20	30	40	50	60

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER AUTOMATIC ROD OIL CUPS.

For Engine Crank Pins.



Fig. 523. Screw Feed.



Fig. 524. Needle Valve Feed.

The Lunkenheim Automatic "Screw Feed" and "Needle Valve" Rod Oil Cups have been upon the market for a number of years and are well known to the trade. They are simple, compact and well made, and while not possessing the advantages which our "Champion" Cup does, will be found very satisfactory for use on crank pin bearings. We list them for the convenience of those of our customers who desire to continue their use. The "Needle Valve" Cups are not made smaller than No. 1. When ordering mention whether "Screw-Feed" or "Needle Valve Feed" are wanted.

PRICE LIST.

Number.....	0	1	1½	2	3	4
Extreme Outside Diameter of Cup.....inches	1½	1¾	2	2¼	2½	2¾
Extreme Height of Cup (plug raised, open to fill).....inches	3½	4¾	4½	5½	5½	6
Outside Diameter of Glass.....inches	1½	1¾	1¾	2	2¼	2½
Height of Glass.....inches	1½	1¾	1¾	1¾	2½	2¾
Capacity.....ounces	¾	1	1½	2½	4	5
Shank Pipe Thread.....Inch	¾	¾	¾	¾	¾	¾
Finished Brass.....each	1 10	1 50	2 00	2 50	3 00	4 00
Nickel Plated.....each	1 25	1 70	2 25	2 75	3 30	4 35

To avoid mistakes when ordering extra glasses and cork washers, specify name and number of cup as stamped on same.

See page 384 for prices on extra glasses and cork washers.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
PLAIN LOCOMOTIVE CRANK PIN OIL CUP.
With Loose Wire Feed.



Fig. 530.

PRICE LIST.

Number,.....	1½	2
Extreme Outside Diameter of Cup,.....inches	2½	2¾
Extreme Height of Cup,..... inches	4½	4¾
Inside Diameter,.....inches	1½	1¾
Capacity,.....ounces	1½	2½
Finished Brass,.....each	1 80	2 00

Unless thread is specified shanks will be left blank.

SPECIAL NOTICE:—While on the following pages we show only a few styles of Locomotive Oil Cups, we are prepared to furnish other styles of cups such as are now in use, promptly, and at reasonable prices.

We are furnishing goods of this kind to some of the largest railroad systems in the country with entirely satisfactory results. Special circular sent upon application.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

SLIDE TOP LOCOMOTIVE BRASS GUIDE OIL CUP.



Fig. 531.

The attention of Locomotive Builders and Master Mechanics is called to the improved filling arrangement on these oil cups, by which they can be quickly and easily filled without the annoyance usually experienced with oil cups having the screw-plug filler.

They are compactly constructed, and the slide is warranted not to leak; are provided with the pointed needle feed, and the flow of oil can be readily regulated from the outside and feeds only while the engine is running.

PRICE LIST.

Number,	1½	2	3
Extreme Outside Diameter of Cup,.....inches	2½	2½	3
Extreme Height of Cup,.....inches	4½	4½	5
Inside Diameter,.....inches	1½	1¾	2
Capacity,.....ounces	1½	2½	4
Finished Brass,.....each	2 50	3 00	4 00

Unless thread is specified shanks will be left blank.

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

**LOCOMOTIVE ROCKER BOX AND LINK HANGER
OIL CUP.**



Fig. 169.

This form of cup has been adopted as standard on quite a number of the large Railroads for use on locomotive Rocker Boxes and Link Hangers. They are very strong and are made of a high grade bronze composition.

Unless otherwise specified the shanks will be left blank.

PRICE LIST.

Size,	number	1
Finished Brass,	each	1 60

All genuine Oil Cups have the name LUNKENHEIMER on them.

LUNKENHEIMER

LOCOMOTIVE GUIDE AND PISTON ROD OIL CUP.



Fig. 168.

This Cup was designed for use on locomotive guides, Piston rods and Valve stems. It can be regulated to feed any desired quantity of oil, and owing to the fact that this regulating device is encased, it cannot be tampered with. The cap is merely forced over the cup and can be quickly removed and replaced.

It is in use on quite a number of the large Railroads in the United States.

Unless otherwise specified the shanks will be left blank.

PRICE LIST.

Size, .....number	1	2
Finished Brass, .....each	2 80	4 00

All genuine Oil Cups have the name LUNKENHEIMER on them.

LUNKENHEIMER
MAIN AND SIDE ROD OIL CUP.

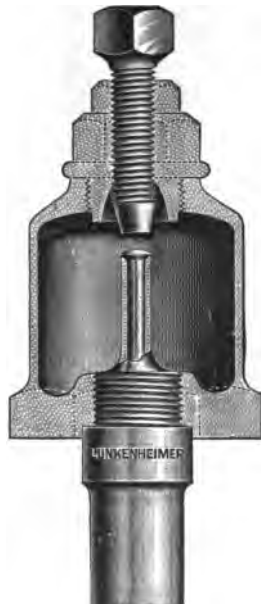


Fig. 167.

For a practical, strong and durable Locomotive Main and Side Rod Oil Cup the Lunkenger device shown above has not its equal. The bodies are made of the very best grade of bronze composition but the shanks are made of steel, owing to the severe strain which they are subjected to. They are also renewable, and hence it is not necessary that the entire cup be discarded should the shank break.

The feed is operated by the pulsation of the rod which operates a valve inside the cup. The lift of this valve is limited by the screw at the top by which means any desired quantity of oil can be fed.

Quite a number of the large railroads in the United States have adopted this style of Rod Cup.

Unless otherwise specified the shanks will be left blank.

PRICE LIST.

Size, number	1	2	3
Finished Brass, each	4 00	4 70	6 00

All genuine Oil Cups have the name LUNKENHEIMER on same.

**LUNKENHEIMER
SHAFT OILERS.****Fig. 533.
Shaft Oiler.****Fig. 534.
Shaft Oiler with Loose Wire
and Wood Plug.****Fig. 533.
Sectional.****DIRECTIONS FOR USING LUNKENHEIMER SHAFT OILERS.**

Fill the oiler (full) with oil, screw on the socket air-tight, and then screw the stem tightly into the oil-hole in bearing. When the cup needs refilling unscrew the stem out of the hole, take the oiler apart, and proceed as before. See that the hole through stem is always clear of any obstruction before putting the oiler in its place.

See that the glass globe is always tight in its socket.

TO REGULATE:—The oilers are shipped set for their greatest feed. The oil-hole in stem is drilled parallel with the slot in head of the set-screw. By turning the regulating screw a *quarter-turn backward* the supply of oil is entirely cut off. Between these two positions of the screw any desired amount of feed may be had.

PRICE LIST.

Shanks are threaded $\frac{3}{8}$ inch on point, 16 threads to the inch.

Number,.....	1	2	3
Capacity,.....ounces	1	1½	2¾
Diameter, .....inches	1¾	2	2½
Height, inches	2½	3	3½
Finished Brass, .....each	50	55	60
Extra Glasses,.....each	08	08	08
Extra Cork Washers,.....per dozen	15	15	15

Shaft oilers with loose wire and wood plug are furnished at same price as regular pattern.

All genuine Shaft Oilers have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

BRASS HINGE LID OIL CUPS.



Fig. 538. Small Base.



Fig. 539. Large Base.

PRICE LIST.

Number,.....	1	2	3	4	5	6	7
Outside Diameter,.....inches	$\frac{7}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2
Shank Pipe Thread,.....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$
Finished Brass (Fig. 538 Small Base, Fig. 539 Large Base), .....each	70	85	1 20	1 60	2 10	2 50	2 70
Finished Brass with Elbow Shank (Fig. 971), .....each	85	1 15	1 60	2 10	2 65	3 05	3 25
Add to List for Brass Tubes,.....each	10	10	15	15	15	15	15
Add to List for Nickel Plating,.....each	10	10	10	15	15	15	.20

All genuine Oil Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER BRASS OIL CUPS.



Fig. 540.
Plain.



Fig. 542.
With L. H. Cock.
Fig. 395.
With T. H. Cock.



Fig. 915.
With Elbow Shank.



Fig. 207.
Plain, with Square
on Cap.



Fig. 205.
With L. H. Cock and
Square on Cap.



Fig. 206.
Locomotive Pattern, with
Square on Cap.

Fig. 204.
With T. H. Cock and Square on Cap.

PRICE LIST.

Number.	00	0	1	2	3	4	5	6	7	8	9
Outside Diameter, .....inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	
Shank Pipe Thread, .....inch	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$
Plain Finished Brass, Fig. 540, .....each	25	30	35	40	60	90	1 25	1 60	1 75	2 25	2 75
Locomotive Pattern, Finished Brass Fig. 541, .....each	30	35	40	50	75	1 00	1 50	1 80	2 00	2 50	3 00
Finished Brass, with T. H. Cock, Fig. 395, .....each	75	80	90	1 00	1 50	2 00	2 50	2 75	3 00	3 75	4 50
Finished Brass, with L. H. Cock, Fig. 542, .....each	85	90	1 00	1 10	1 60	2 20	2 75	3 00	3 25	4 00	5 00
Finished Brass, with Elbow Shank, Fig. 915, .....each	55	65	75	85	1 00	1 40	1 80	2 15	2 40	3 00	3 80
Finished Brass, with Square on Cap, Fig. 207, .....each	60	70	95	1 05	1 30	1 90	2 10	2 40	2 80	3 50	4 20
Finished Brass, with L. H. Cock and Square on Cap, Fig. 205, .....each	.....	1 20	1 40	1 60	2 00	2 20	3 45	3 75	4 00	5 40	6 30
Finished Brass, with T. H. Cock, and Square on Cap, Fig. 204, .....each	.....	1 05	1 30	1 50	1 90	2 30	3 30	3 45	3 75	5 10	6 00
Finished Brass, with Elbow Shank and Square on Cap, Fig. 203, .....each	85	95	1 30	1 40	1 55	2 25	2 50	2 90	3 30	4 10	5 00
Finished Brass, Locomotive Pattern, with Square on Cap, Fig. 206, .....each	70	85	1 05	1 25	1 50	1 90	2 40	2 80	3 30	4 30	5 00
Add to List for Brass Tubes, .....each	10	10	10	10	15	15	15	15	15	20	20
Add to List for Nickel Plating, .....each	10	10	10	10	10	15	15	15	20	20	20

All genuine cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

SPRING LID PLAIN BRASS OIL CUPS.



Fig. 209.
Plain.



Fig. 208.
Locomotive Pattern.

From the sectional view above, the construction of the Lunkenheim Spring Lid Brass Oil Cup can readily be seen. It is provided with a spring attached to the cap, the object of which is to provide means for quickly filling the cup with oil, which can be done by simply raising the lid and forcing it to one side. The spring will firmly hold the lid in place and there is positively no danger of the same jarring out of position and permitting the oil to spill out of the cup.

PRICE LIST.

Size,.....number	00	0	1	2	3	4	5	6	7	8	9
Outside Diameter, .....inches	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	1 $\frac{7}{8}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$
Shank Pipe Thread, .....inch	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
Plain, Finished Brass, .....each	40	50	60	70	1 00	1 25	1 60	1 70	2 00	2 50	2 90
Locomotive Pattern, Finished Brass,.....each	65	80	1 00	1 20	1 35	1 60	1 80	2 20	2 60	3 00	3 50

All genuine Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER

PRESSURE TYPE PLAIN BRASS OIL CUPS.



Fig. 210.
With L. H. Cock.

To supply the demand for a plain, inexpensive Oil Cup for the lubrication of small steam or air cylinders, such, for instance, as on pumps, air compressors, etc., we have designed the above which is fully guaranteed to give perfect satisfaction.

It is very strong and is nicely finished, and is provided with either tee or lever handle, by means of which the cup can easily be filled while the engine is running.

PRICE LIST.

Size, .....number	1	2	3	4	5	6
Finished Brass,.....each	1 60	1 90	2 30	2 70	3 90	4 40
Extreme Outside Diameter,.....inches	1	1½	1¾	1¾	1¾	2½
Shank Pipe Thread, .....inch	¾	¾	¾	¾	¾	¾

All genuine Cups have the name LUNKENHEIMER stamped on same.

LUNKENHEIMER
BRASS LOOSE PULLEY OILER.



Fig. 537.

This Oiler must be attached to hub of pulley, is easily filled and regulated, will not throw or waste oil, and a trial will convince users that it is a simple and satisfactory oiler for loose pulleys. It is guaranteed to give satisfaction, one filling lasting from two to four weeks, and feeding only when pulley is in motion.

PRICE LIST.

Number,	0	1	2	3	4
Height of Cup (plug raised to fill),.....inches	1 $\frac{1}{8}$	2 $\frac{1}{8}$	2 $\frac{3}{8}$	3	3 $\frac{1}{2}$
Length of Cup,.....inches	1 $\frac{1}{4}$	2	2 $\frac{1}{8}$	2 $\frac{1}{2}$	2 $\frac{3}{4}$
Diameter of Body,.....inches	1	1 $\frac{1}{8}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2
Capacity,.....ounces	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1 $\frac{1}{4}$	1 $\frac{3}{4}$
Rough Brass, Bronzed,.....each	25	30	40	50	65

Shanks on Nos. 0, 1 and 2 are threaded $\frac{3}{8}$ inch on point, 16 threads to the inch. Shanks on Nos. 3 and 4 are threaded $\frac{1}{4}$ inch pipe thread.

All genuine Loose Pulley Oilers have the name LUNKENHEIMER on same.

LUNKENHEIMER

CYLINDRICAL AND URN-SHAPED GLASSES.



Fig. 526.



Fig. 527.

These Glasses are clear, strong and uniform in size, and interchangeable with all styles of glass cups made by us.

PRICE LIST.

Number,	000	00	0	1	1½	2	3	4	5	6	8
Outside Diameter of Cylindrical Glasses, in.	1	1½	1¾	1½	1¾	2	2½	2¾	3	3½	4½
Height of Cylindrical Glasses,.....inches	¾	1	1½	1¾	1½	1¾	2½	2¾	3	4	5
Outside Diameter at upper end of Urn-Shaped Glasses,.....inches	.....	1½	1¾	1½	1¾	2	2½	2¾	3	3½	.....
Height of Urn-Shaped Glasses,.....inches	.....	1½	1¾	2	2½	2¾	3½	3¾	3½	4½	.....
Cylindrical or Urn-Shaped Glasses,.....each	05	06	08	10	10	12	15	25	35	65	1 50
Cork Washers,..... per dozen	15	18	24	30	36	40	45	50	60	75	1 50

In ordering Glasses always specify whether Cylindrical or Urn-shaped are wanted.

SECTION XIV.

DIMENSIONS
OF LUNKENHEIMER
STANDARD PRODUCTS.

STANDARD DIMENSIONS OF WROUGHT-IRON PIPE
FOR WATER, GAS OR STEAM.

Nominal Size Inch.	Actual Inside Diameter Inch.	Actual Outside Diameter Inch.	Diameter at Bottom of Thread at End of Pipe Inch.	Diameter at Top of Thread at End of Pipe Inch.	Number of Threads per Inch	Length of Perfect Screw Inch.	Weight per Foot of Length Lbs.	Contents in U. S. Gallons per Foot
$\frac{1}{8}$	.270	.405	.334	.393	27	.19	.241	.0006
$\frac{1}{4}$	.364	.540	.433	.522	18	.29	.420	.0026
$\frac{3}{8}$	.494	.675	.567	.656	18	.30	.559	.0057
$\frac{1}{2}$	.623	.840	.701	.815	14	.39	.837	.0102
$\frac{3}{4}$	.824	1.050	.911	1.025	14	.40	1.115	.0230
1	1.048	1.315	1.144	1.283	11 $\frac{1}{2}$	.51	1.668	.0408
1 $\frac{1}{4}$	1.380	1.660	1.488	1.627	11 $\frac{1}{2}$	.54	2.244	.0638
1 $\frac{1}{2}$	1.610	1.900	1.727	1.866	11 $\frac{1}{2}$	.55	2.678	.0918
2	2.067	2.375	2.200	2.339	11 $\frac{1}{2}$	.58	3.609	.1632
2 $\frac{1}{2}$	2.468	2.875	2.620	2.820	8	.89	5.739	.2550
3	3.067	3.500	3.241	3.441	8	.95	7.536	.3673
3 $\frac{1}{2}$	3.548	4.000	3.738	3.938	8	1.00	9.001	.4998
4	4.026	4.500	4.235	4.435	8	1.05	10.665	.6528
4 $\frac{1}{2}$	4.508	5.000	4.732	4.932	8	1.10	12.490	.8263
5	5.045	5.563	5.291	5.491	8	1.16	14.502	1.020
6	6.065	6.625	6.346	6.546	8	1.26	18.762	1.469
7	7.023	7.625	7.340	7.540	8	1.36	23.271	1.999
8	7.982	8.625	8.334	8.534	8	1.46	28.177	2.611
9	9.000	9.625	9.327	9.527	8	1.57	33.701	3.300
10	10.019	10.750	10.445	10.645	8	1.68	40.065	4.081
12	12.000	12.750	12.431	12.631	8	1.87	48.985	5.875

Taper of Threads $\frac{3}{4}$ inch to one foot.

The angle of thread is 60°, and it is slightly rounded off at top and bottom.
 1 $\frac{1}{4}$ inch and below are butt-welded and tested to 300 lbs. per Sq. in.
 1 $\frac{1}{2}$ inch and above are lap-welded and tested to 500 lbs. per Sq. in.

DIMENSIONS OF ENGLISH PIPE AND FLANGES.

Nominal Size	Actual Outside Diameter	Diameter at Bottom of Thread at End of Pipe	Number of Threads per Inch	Diameter of Flange	Thickness of Flange		Diameter of Bolt Circle	Diameter of Bolts	Number of Bolts
					Inches				
Inches	Inches	Inches		Inches	Brass	Iron	Inches	Inch	
1/8	.3825	.3367	28						
1/4	.5180	.4506	19						
3/8	.6563	.5889	19						
1/2	.8257	.7342	14	2 1/8	7/8		2 3/8	3/8	4
3/4	1.0410	.9495	14	3 1/8	1 1/8		2 1/2	3/8	4
1	1.3090	1.1925	11	3 1/8	1 1/8		2 3/8	1/2	4
1 1/4	1.6500	1.5335	11	4 1/2	3/4		3 3/8	1/2	4
1 1/2	1.8825	1.7660	11	5 1/8	1 1/8		4	1/2	4
2	2.3470	2.2305	11	5 3/8	1 1/8	5/8	4 5/8	3/8	4
2 1/2	3.0013	2.8848	11	6 1/4	1 1/8	1 1/8	5 1/8	3/8	4
3	3.4850	3.3685	11	7 1/2	1 1/2	3/4	6 1/4	3/8	4
3 1/2	3.9120	3.7955	11	8 1/8	1 3/8	1 1/8	7 1/8	3/8	4
4	4.3390	4.2225	11	9 1/8	1 3/8	1 1/8	7 3/8	3/4	4
4 1/2				9 3/8	1 3/8	1 1/8	8 1/8	3/4	8
5				10 1/8	1 3/8	1 1/8	8 1/8	3/4	8
6				11 3/8	1 3/8	1	9 3/8	3/4	8
7				12 1/8	3/4	1 1/8	11 1/8	3/4	8
8				13 1/4	1 1/8	1 1/8	12 1/4	3/4	8
9				14 1/8		1 1/8	13 1/8	3/4	12
10				15 3/4		1 1/8	14 1/4	3/4	12
12				17 3/4	.....	1 1/4	16 3/8	3/4	12

Unless otherwise instructed, all articles ordered with English Threads will be threaded as above, which is the Whitworth Standard. If desired, we can supply all articles with the Stewart and Lloyd Standard of threads instead. Above 4-inch size there is no English Standard, and the American Standard, as a rule, is used.

DIMENSIONS OF STANDARD AND HEAVY BRASS FLANGES.

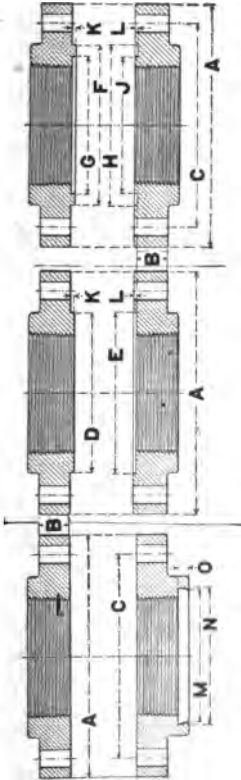
Size of Flange,	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Standard, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
Diameter of Flange, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Heavy, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
Thickness of Flange, .....inch	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Standard, .....inch	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Heavy, .....inch	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
Diameter of Bolt Circle, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Standard, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Heavy, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
Diameter of Bolts, .....inch	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Standard, .....inch	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Heavy, .....inch	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
Length of Bolts, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Standard, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Heavy, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
Number of Bolts,	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Standard, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8
(Heavy, .....inches	$\frac{3}{8}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8

DIMENSIONS OF STANDARD IRON FLANGES.

For 125 Pounds Working Pressure.

Size of Flange, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
Diameter of Flange, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Standard, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Heavy, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
Thickness of Flange, .....inch	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Standard, .....inch	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Heavy, .....inch	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
Diameter of Bolt Circle, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Standard, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Heavy, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
Diameter of Bolts, .....inch	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Standard, .....inch	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Heavy, .....inch	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
Length of Bolts, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Standard, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Heavy, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
Number of Bolts,	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Standard, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16
(Heavy, .....inches	1	$1\frac{1}{4}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	8	9	10	12	14	15	16

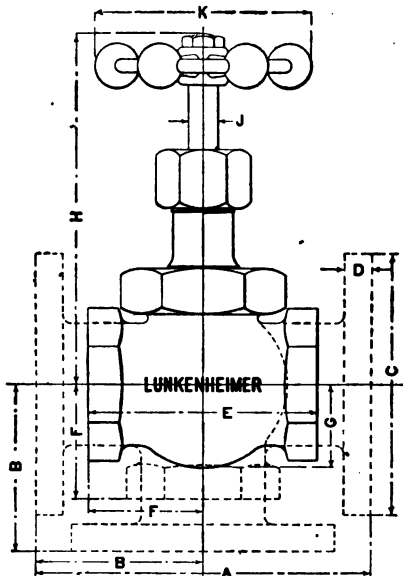
Standard for Pressures above 125 Pounds.



Tongue and Groove.

	1	1½	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
A Diameter of Flange.....inches	4½	5	6	7½	8½	9	10	10½	11	12½	14	15	16	17½	20	22½	25	28
B Thickness of Flange.....inches	4½	5	6	7½	8½	9	10	10½	11	12½	14	15	16	17½	20	22½	25	28
C Diameter of Bolt Circle.....inches	3½	3½	4½	5	5½	6½	7½	8½	9½	10½	11½	13	14	15½	17½	20	21	22½
D Diameter of Male.....inches	2½	2½	3½	3½	4½	5	5½	6	6½	7½	8½	9½	10½	11½	12½	15	16½	17½
E Diameter of Female.....inches	2½	2½	3½	3½	4½	5½	5½	6½	6½	7½	8½	9½	10½	11½	12½	15	16½	17½
F Outside Diameter of Tongue.....inches	2½	3	3½	4½	4½	5½	5½	6½	6½	7½	8½	9½	10½	11½	12½	15	16½	17½
G Inside Diameter of Tongue.....inches	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	8½	9½	10½	11½	13	15	16½
H Outside Diameter of Groove.....inches	2½	3	3½	4½	4½	5½	5½	6½	6½	7½	8½	9½	10½	11½	12½	15	16½	17½
J Inside Diameter of Groove.....inches	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	8½	9½	10½	11½	13	15	16½
K Height of Male and Tongue.....inches	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	8½	9½	10½	11½	13	15	16½
L Depth of Female and Groove.....inches	1½	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	8½	9½	10½	11½	13	15	16½
M Small Diameter of Calking Recess.....inches	2½	3	3½	4	4½	5	5½	6	6½	7½	8½	9½	10½	11½	13	15	16½	18
N Large Diameter of Calking Recess.....inches	3½	4½	5	5½	6	6½	7	7½	8	8½	9½	10½	11½	13	15	16½	18	20
O Depth of Calking Recess.....inches	3½	4½	5	5½	6	6½	7	7½	8	8½	9½	10½	11½	13	15	16½	18	20
P Diameter of Bolts.....inches	½	½	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
Length of Bolts.....inches	2½	2½	3	3	3½	3½	3½	4	4	4½	4½	5	5½	5½	6	6½	6½	6½
Number of Bolts.....	4	4	4	4	8	8	8	8	8	8	12	12	12	16	20	20	20	20

LUNKENHEIMER **REGROUNDING GLOBE, ANGLE AND CROSS VALVES.** Medium Pattern for 200 Pounds Working Pressure. **BRASS.**



LEADING DIMENSIONS.

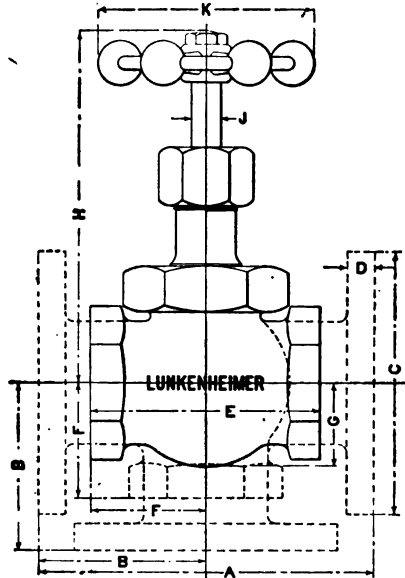
Size of Valve, .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
A Face to Face Flange End Globe Valve, .....inches	.....	.....	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$6\frac{1}{4}$	$7\frac{1}{8}$	$8\frac{1}{4}$	$8\frac{3}{4}$	$10\frac{1}{8}$	$10\frac{1}{4}$
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve, .....inches	.....	.....	$1\frac{1}{8}$	$1\frac{1}{4}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$4\frac{1}{4}$	$4\frac{3}{8}$	$5\frac{1}{4}$	$5\frac{3}{8}$
C Diameter of Flanges, inches	.....	.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$	8	9
D Thickness of Flanges, inch	.....	.....	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
E Face to Face Screw End Globe Valve, .....inches	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$7\frac{1}{8}$	$9\frac{1}{8}$
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve, .....inches	$\frac{3}{4}$	1	1	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{1}{4}$	$4\frac{1}{4}$
G Center of Port to Bottom of Body, .....inches	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{3}{4}$	3	$3\frac{1}{4}$
H Center of Port to Top of Stem—When Open, .....inches	3	4	4	$4\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{1}{8}$	6	7	$8\frac{1}{8}$	$9\frac{1}{4}$	$9\frac{1}{8}$	$11\frac{1}{4}$	$12\frac{1}{8}$
Center of Port to Top of Stem—When Closed, .....inches	$2\frac{1}{4}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$5\frac{1}{4}$	$6\frac{1}{8}$	$7\frac{1}{4}$	$8\frac{1}{8}$	$8\frac{3}{4}$	$10\frac{1}{8}$	$11\frac{1}{4}$
J Diameter of Stem, .....inch	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	1
K Diameter of Hand Wheel, .....inches	$1\frac{1}{8}$	2	2	$2\frac{1}{8}$	$2\frac{1}{4}$	$3\frac{1}{8}$	$3\frac{1}{4}$	4	$4\frac{1}{4}$	$5\frac{1}{8}$	6	8	9

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 32, 33 and 36.

All genuine valves have the name LUNKENHEIMER cast in body.

LUNKENHEIMER
REGRINDING GLOBE, ANGLE AND CROSS VALVES.
Extra Heavy Pattern for 300 Pounds Working Pressure.
BRASS.



LEADING DIMENSIONS.

Size of Valve,.....Inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
A Face to Face Flange End Globe Valve.....Inches	3 $\frac{3}{8}$	4	4 $\frac{1}{2}$	5 $\frac{1}{8}$	5 $\frac{3}{8}$	6 $\frac{1}{8}$	7 $\frac{1}{8}$	8 $\frac{1}{8}$	9	10 $\frac{1}{8}$	10 $\frac{3}{8}$	10 $\frac{3}{8}$
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve,.....Inches	1 $\frac{1}{8}$	2	2 $\frac{1}{4}$	2 $\frac{3}{8}$	2 $\frac{7}{8}$	3 $\frac{1}{8}$	3 $\frac{3}{8}$	4 $\frac{1}{8}$	4 $\frac{3}{8}$	5 $\frac{1}{8}$	5 $\frac{3}{8}$	5 $\frac{3}{8}$
C Diameter of Flanges,.....Inches	2 $\frac{1}{4}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7	7 $\frac{1}{2}$	8 $\frac{1}{2}$	9	9
D Thickness of Flanges,.....Inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{7}{16}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
E Face to Face Screw End Globe Valve,.....Inches	2 $\frac{1}{4}$	2 $\frac{1}{4}$	2 $\frac{1}{2}$	3 $\frac{1}{8}$	3 $\frac{3}{8}$	4	4 $\frac{1}{8}$	5 $\frac{1}{8}$	6 $\frac{1}{8}$	7 $\frac{1}{8}$	9	10 $\frac{1}{8}$
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,.....Inches	1 $\frac{1}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{3}{8}$	1 $\frac{3}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{4}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	4 $\frac{1}{8}$	5 $\frac{1}{8}$
G Center of Port to Bottom of Body,.....Inches	1 $\frac{1}{8}$	1 $\frac{1}{8}$	$\frac{3}{8}$	1 $\frac{1}{8}$	1 $\frac{1}{4}$	1 $\frac{1}{8}$	1 $\frac{1}{8}$	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$
H Center of Port to Top of Stem—When Open,.....Inches	4 $\frac{1}{8}$	4 $\frac{3}{8}$	4 $\frac{1}{2}$	5 $\frac{1}{8}$	6 $\frac{1}{8}$	6 $\frac{1}{8}$	7 $\frac{1}{8}$	9 $\frac{1}{8}$	10 $\frac{1}{8}$	11 $\frac{1}{8}$	12 $\frac{1}{8}$	14
H Center of Port to Top of Stem—When Closed,.....Inches	3 $\frac{3}{8}$	3 $\frac{3}{8}$	4 $\frac{1}{8}$	5 $\frac{1}{8}$	5 $\frac{1}{8}$	6 $\frac{1}{8}$	7 $\frac{1}{8}$	8 $\frac{1}{8}$	9 $\frac{1}{8}$	10 $\frac{1}{8}$	11 $\frac{1}{8}$	12 $\frac{1}{8}$
J Diameter of Stem,.....Inches	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
K Diameter of Hand Wheel,.....Inches	2	2	2 $\frac{1}{8}$	2 $\frac{1}{8}$	3 $\frac{1}{8}$	3 $\frac{1}{8}$	4	4 $\frac{1}{8}$	9	10	12	14

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 34, 35 and 36.

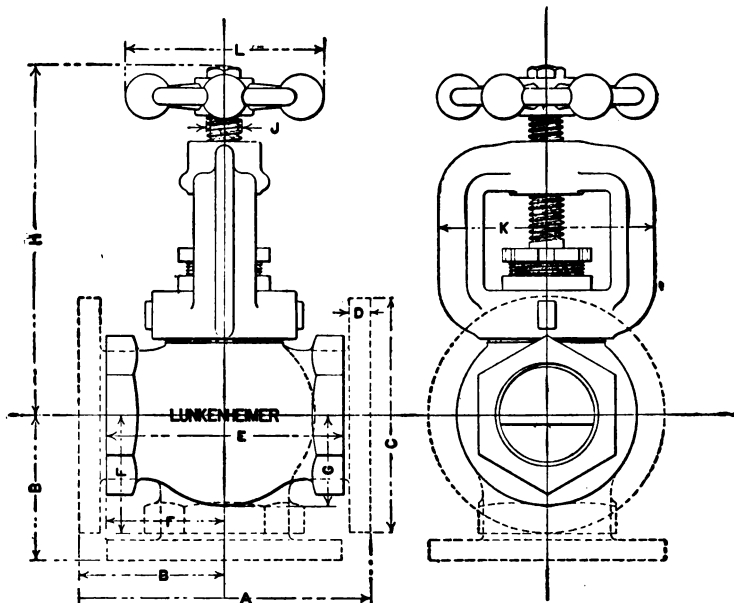
All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER

GLOBE, ANGLE AND CROSS VALVES.

With Screwed Yoke and Outside Thread on Stems.
Medium Pattern. For 200 lbs. Working Pressure.

BRASS



LEADING DIMENSIONS.

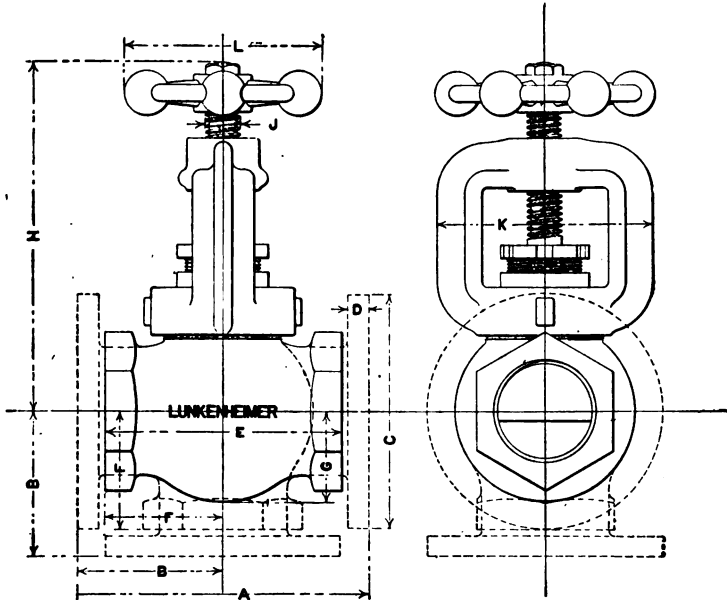
Size of Valve,	inches	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
A Face to Face Flange End Globe Valve,	inches	3 1/2	4 3/8	4 1/2	5 5/8	6 3/8	7 1/2	8 1/4	8 3/4
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve,	inches	1 1/4	2 1/8	2 1/2	2 3/4	3 1/8	3 3/4	4 1/4	4 3/4
C Diameter of Flanges,	inches	3	3 3/4	4	4 1/2	5	6	7	7 3/4
D Thickness of Flanges,	inches	7/8	7/8	1 1/8	3/4	1 1/8	7/8	1 1/8	7/8
E Face to Face Screw End Globe Valve,	inches	2 7/8	2 7/8	3 1/4	3 3/4	4 1/8	5 1/4	6 1/8	7 1/8
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,	inches	1 7/8	1 3/4	1 5/8	1 3/4	2 1/8	2 3/8	3 1/8	3 3/8
G Center of Port to Bottom of Body,	inches	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2 3/8	2 3/8
H Center of Port to Top of Stem—When Open,	inches	4 1/8	4 1/8	5 1/8	6 1/8	7 1/8	8 1/8	9 1/8	9 1/8
I Center of Port to Top of Stem—When Closed,	inches	4 1/8	4 1/8	5 1/8	5 1/8	6 1/8	7 1/8	8 1/8	8 1/8
J Diameter of Stem,	inches	7/8	3/4	3/4	3/4	3/4	3/4	3/4	1
K Width of Yoke,	inches	2 1/8	2 1/8	3 1/8	3 1/8	4	4 1/8	5 1/8	5 1/8
L Diameter of Hand Wheel,	inches	2 1/8	2 1/8	3 3/8	3 1/8	4	4 3/8	5 3/8	6

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 38 and 39.

All genuine valves have the name LUNKENHEIMER cast in body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.
With Screwed Yoke and Outside Thread on Stems.
Extra Heavy Pattern for 300 Pounds Working Pressure.
BRASS.

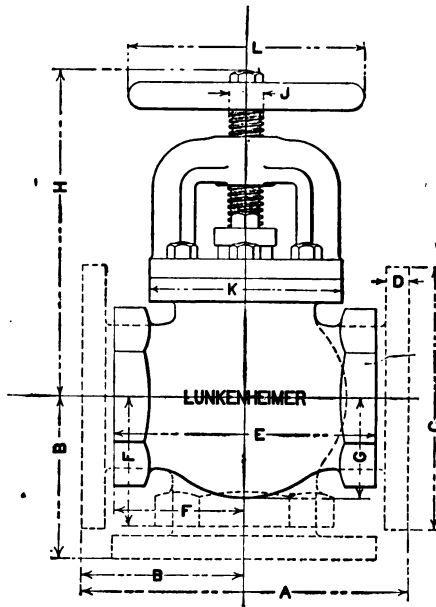


LEADING DIMENSIONS.

Size of Valve,	inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
A Face to Face Flange End Globe Valve,	inches	4	$4\frac{1}{2}$	$5\frac{1}{8}$	$5\frac{3}{4}$	$6\frac{1}{4}$	$7\frac{1}{2}$	$8\frac{1}{2}$	9
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valves,	inches	2	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{7}{8}$	$3\frac{1}{8}$	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{3}{4}$
C Diameter of Flanges,	inches	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$
D Thickness of Flanges,	inches	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$
E Face to Face Screw End Globe Valve,	inches	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{3}{8}$	4	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,	inches	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{5}{8}$	2	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$
G Center of Port to Bottom of Body,	inches	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{8}$	$2\frac{3}{8}$
H Center of Port to Top of Stem—When Open,	inches	$4\frac{7}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$6\frac{3}{8}$	$7\frac{1}{8}$	$8\frac{1}{8}$	$9\frac{1}{8}$	$10\frac{1}{8}$
I Center of Port to Top of Stem—When Closed,	inches	$4\frac{1}{2}$	$5\frac{1}{8}$	$5\frac{3}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$7\frac{3}{8}$	$8\frac{1}{8}$	$9\frac{1}{8}$
J Diameter of Stem,	inches	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$
K Width of Yoke,	inches	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$4\frac{3}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$
L Diameter of Hand Wheel,	inches	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	4	$4\frac{1}{8}$	9	10

Angle and Cross Patterns shown in dotted lines.
The above dimensions refer to valves shown on pages 40 and 41.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES
 Flanged Hub. Outside Screw and Yoke.
 Medium Pattern, for 200 Pounds Working Pressure.
BRASS.



LEADING DIMENSIONS.

Size of Valve,.....Inches	1½	2	2½	3	3½	4	4½	5	6	7	8
A Face to Face Flange End Globe Valve,.....Inches	6½	7½	8½	8½	8½	10½	10½	11½	12½	14	15½
B Center to Face of Inlet or Outlet of Flange End, Angle or Cross Valve,.....Inches	3½	3½	4½	4½	4½	5½	5½	5½	6½	7½	7½
C Diameter of Flanges,.....Inches	5	6	7	7½	8½	9	9½	10	11	12½	13½
D Thickness of Flanges,.....Inches	4½	5½	6½	7½	7½	9½	9½	10½	11½	13½	14½
E Face to Face Screw End Globe Valve,.....Inches	4½	5½	6½	7½	7½	9½	9½	10½	11½	13½	14½
F Center to Face of Inlet or Outlet of Screw End, Angle or Cross Valve,.....Inches	2½	2½	3½	3½	3½	4½	4½	5½	5½	6½	7½
G Center of Port to Bottom of Body.....Inches	1½	1½	2½	2½	3½	3½	4½	4½	5½	6	7
H Center of Port to Top of Stem—When Open, in.	7½	8½	9½	10½	11½	12½	13½	14½	16	17½	20½
Center of Port to Top of Stem—When Closed, in.	7	7½	8½	9½	10½	11½	11½	12½	14	15½	17½
J Diameter of Stem,.....Inches	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
K Diameter of Body and Yoke Flanges,.....Inches	3½	4½	5½	5½	6½	7	7½	8½	9½	10½	11½
L Diameter of Handwheel,.....Inches	4	5½	6	7	8	9	9	10	12	14	16

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 44, 45, 144 and 145.
 All genuine valves have the name LUNKENHEIMER cast on body.

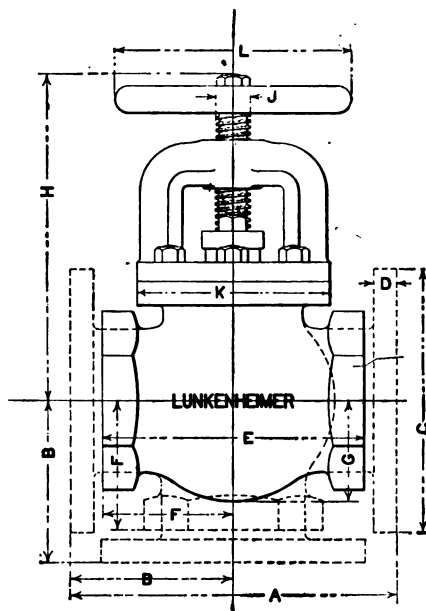
LUNKENHEIMER

• GLOBE, ANGLE AND CROSS VALVES.

Flanged Hub. Outside Screw and Yoke.

Extra Heavy Pattern, for 300 Pounds Working Pressure.

BRASS.



LEADING DIMENSIONS.

Size of Valve,	1½	2	2½	3	3½	4	4½	5	6	7	8
A Face to Face Flange End Globe Valve,	6¼	7¼	8½	9	10½	10¾	11¾	12¾	13¾	15½	16¾
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve,	3¾	3¾	4¼	4½	5½	5½	5½	6¼	6½	7½	8½
C Diameter of Flanges,	5	6	7	7½	8½	9	9½	10	11	12½	13½
D Thickness of Flanges,	½	¾	1	1¼	1½	1¾	2	2¼	2½	3	3½
E Face to Face Screw End Globe Valve,	4½	5½	6½	7½	9	10½	10¾	11¾	12¾	14	15½
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,	2¾	2¾	3¼	3½	4½	5½	5½	5½	6¼	7	7½
G Center of Port to Bottom of Body,	1½	2	2½	2¾	3½	3¾	4½	4½	5½	6½	7½
H Center of Port to Top of Stem—When Open,	8½	9½	10½	11½	12½	13½	14½	15½	17	18½	20½
I Center of Port to Top of Stem—When Closed,	7½	8½	10	10½	11½	12½	13½	14½	15½	17½	19½
J Diameter of Stem,	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3½	4
K Diameter of Body and Yoke Flanges,	4	4½	5½	6½	6¾	7½	7¾	8½	10½	11½	12½
L Diameter of Hand Wheel,	4	8	9	10	12	14	14	16	18	20	22

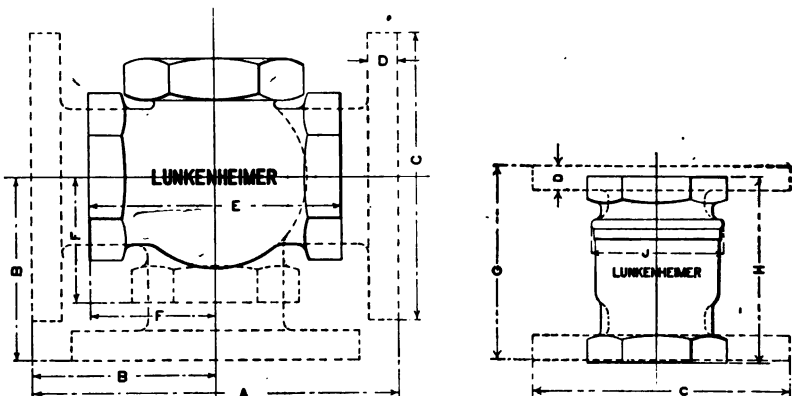
Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 46, 47, 146 and 147.

All genuine valves have the name LUNKENHEIMER cast on same.

LUNKENHEIMER REGRINDING HORIZONTAL, ANGLE AND VERTICAL CHECK VALVES.

**Medium Pattern. For 200 Pounds Working Pressure.
BRASS.**



HORIZONTAL AND ANGLE CHECK VALVES. LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
A Face to Face Flange End Horizontal Valve,.....inches			$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{4}$	$8\frac{1}{4}$	$8\frac{3}{4}$	$8\frac{1}{2}$	$10\frac{1}{8}$
B Center to Face of Inlet or Outlet of Flange End Angle Valve,....in.			$1\frac{1}{8}$	$1\frac{1}{4}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{3}{4}$	$4\frac{1}{2}$	$5\frac{1}{8}$
C Diameter of Flanges,.....inches			$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9
D Thickness of Flanges,.....inches			$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
E Face to Face Screw End Horizontal Valve,.....inches	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$4\frac{3}{4}$	$6\frac{1}{8}$	$6\frac{3}{4}$	$7\frac{1}{4}$	$9\frac{1}{4}$
F Center to Face of Inlet or Outlet of Screw End Angle Valve,....in.	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{3}{4}$	$3\frac{1}{2}$	$4\frac{1}{8}$

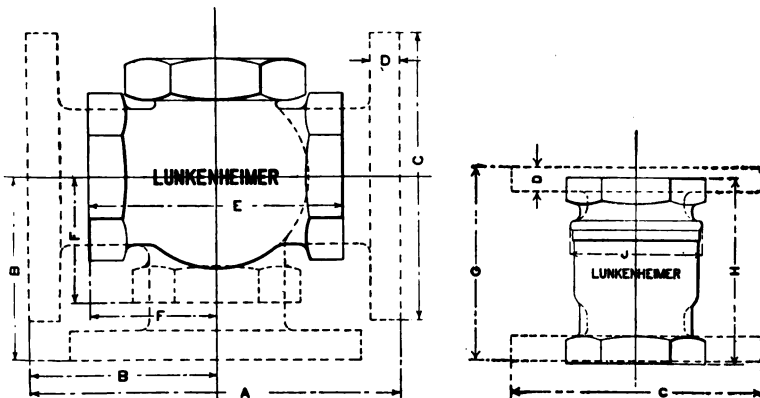
VERTICAL CHECK VALVES.

Size of Valve, .....inches	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
G Face to Face Flange Ends, inches			$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{3}{4}$	$6\frac{1}{4}$	$6\frac{3}{4}$
C Diameter of Flanges,.....inches			$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9
D Thickness of Flanges,.....inch			$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
H Face to Face Screw Ends,.....inches	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	3	$3\frac{3}{8}$	$3\frac{3}{4}$	$4\frac{1}{8}$	5	$5\frac{3}{4}$	$6\frac{1}{4}$	7
J Extreme Outside Diameter of Body,.....inches	$\frac{3}{4}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{4}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{4}$	$4\frac{1}{4}$	$5\frac{1}{8}$	6	$6\frac{3}{4}$

*The above dimensions refer to valves shown on pages 54 and 55.
All genuine valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER REGRINDING HORIZONTAL, ANGLE AND VERTICAL CHECK VALVES.

Extra Heavy Pattern. For 300 Pounds Working Pressure.
BRASS.



Horizontal and Angle Check Valves.

LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
A Face to Face Flange End Horizontal Valve,.....inches		$3\frac{1}{2}$	4	$4\frac{1}{2}$	$5\frac{1}{2}$	$5\frac{3}{4}$	$6\frac{1}{4}$	$7\frac{1}{2}$	$8\frac{1}{2}$	9	$10\frac{1}{2}$	$10\frac{3}{4}$
B Center to Face of Inlet or Outlet of Flange End Angle Valve,.....inches		$1\frac{1}{8}$	2	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{7}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{3}{4}$	$5\frac{1}{8}$	$5\frac{7}{8}$
C Diameter of Flanges,.....inches		$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9
D Thickness of Flanges,.....inches		$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$
E Face to Face Screw End Horizontal Valve,.....inches		$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{3}{8}$	4	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$10\frac{1}{8}$
F Center to Face of Inlet or Outlet of Screw End Angle Valve,.....inches		$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$1\frac{7}{8}$	2	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$

Vertical Check Valves.

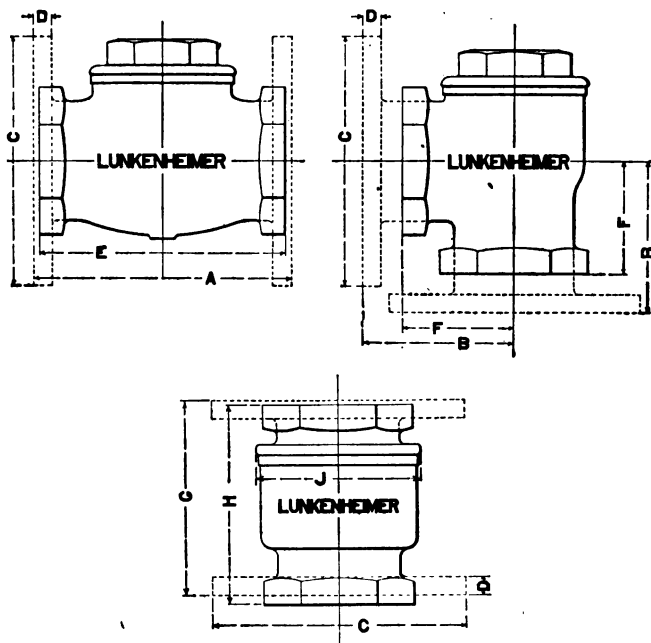
Size of Valve,.....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4
G Face to Face Flange Ends,.....inches		$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{7}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$4\frac{3}{8}$	$5\frac{1}{8}$	$5\frac{3}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$
C Diameter of Flanges,.....inches		$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$	$8\frac{1}{2}$	9
D Thickness of Flanges,.....inches		$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{4}$	$\frac{3}{8}$
H Face to Face Screw Ends,.....inches		$1\frac{1}{8}$	2	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	4	$4\frac{1}{8}$	$5\frac{1}{8}$	$5\frac{3}{8}$	$6\frac{1}{8}$
J Extreme Outside Diameter of Body,.....inches		$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$

The above dimensions refer to valves shown on pages 56 and 57.

All genuine valves have the name LUNKENHEIMER on the body.

LUNKENHEIMER
BALL CHECK VALVES. HORIZONTAL, ANGLE AND
VERTICAL PATTERNS.

Medium Pattern for 200 Pounds Working Pressure.



LEADING DIMENSIONS.

Size of Valve,.....Inches	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3
A Face to Face Flange End Horizontal Valve,.....Inches			2 1/8	2 1/8	3 1/8	4	4 1/8	4 1/8	5 1/8	6 1/8	7 1/8
G Face to Face Flange Ends, Vertical Valve,.....Inches			2 1/8	2 1/8	3 1/8	3 3/8	3 3/8	3 3/8	4 1/8	5 1/8	6 1/8
B Center to Face of, Inlet or Outlet of Flange End Angle Valve,.....Inches			1 5/8	1 1/8	2 1/8	2 1/8	2 3/8	3 1/8	3 3/8	4 1/8	4 3/8
C Diameter of Flanges,.....Inches			2 1/2	3	3 1/2	4	4 1/2	5	6	7	7 1/2
D Thickness of Flanges,.....Inches			3/4	7/8	1	1 1/8	1 1/8	1 1/8	1 3/8	1 3/8	1 3/8
E Face to Face Screw End Horizontal Valve,.....Inches	1 1/8	1 5/8	2 1/4	2 3/4	3 1/8	3 3/8	4 1/8	4 1/8	5 1/8	7 1/8	7 3/8
H Face to Face Screw End Vertical Valve,.....Inches	1 1/8	1 5/8	2	2 1/8	2 1/8	2 1/8	3 1/4	3 3/8	4 1/8	5 1/8	6 1/8
F Center to Face of Inlet or Outlet of Screw End Angle Valve,.....Inches	1 1/8	1 1/8	1	1 1/8	1 1/8	1 1/8	1 1/8	2 1/8	2 1/8	3 1/8	3 3/8
J Extreme Outside Diameter of Body, Vertical Valve,.....Inches	1 1/8	1 1/4	1 1/8	1 1/2	1 1/2	2 1/8	2 1/8	2 1/8	3 1/8	4 1/8	5 1/8

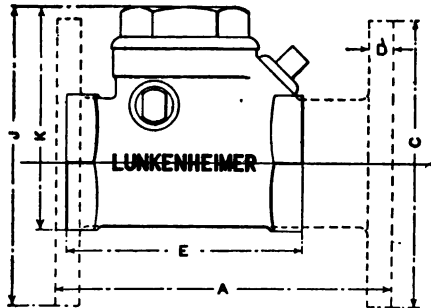
The above dimensions refer to valves shown on page 59.
All genuine valves have the name LUNKENHEIMER cast in the body.

LUNKENHEIMER
REGRINDING SWING CHECK VALVES.

Medium Pattern.

For 150 Pounds Working Pressure.

BRASS.



LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
A Face to Face Flange Ends,.....inches	.....	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$5\frac{1}{4}$	$7\frac{1}{8}$	$7\frac{1}{4}$	$8\frac{1}{8}$
C Diameter of Flanges,.....inches	.....	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$
D Thickness of Flanges,.....inches	.....	$\frac{1}{4}$	$\frac{5}{16}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{1}{2}$
E Face to Face Screw Ends,.....inches	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$4\frac{1}{4}$	$5\frac{1}{4}$	$5\frac{1}{2}$	$6\frac{1}{4}$
J Height of Flange End Valve,.....inches	.....	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$7\frac{3}{8}$
K Height of Screw End Valve,.....inches	$1\frac{1}{8}$	$1\frac{1}{4}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	4	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$

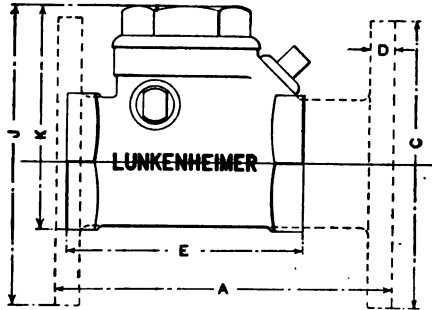
The above dimensions refer to valves shown on page 61.

All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER **REGRINDING SWING CHECK VALVES.**

Extra Heavy Pattern. For 250 lbs. Working Pressure.

BRASS.



LEADING DIMENSIONS.

Size of Valve,.....Inches	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
A Face to Face Flange Ends,.....Inches	.....	$3\frac{3}{8}$	$3\frac{3}{4}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$5\frac{3}{8}$	$6\frac{1}{8}$	$7\frac{3}{8}$	$8\frac{3}{8}$	9
C Diameter of Flanges,.....Inches	.....	$2\frac{1}{2}$	3	$3\frac{3}{8}$	4	$4\frac{1}{2}$	5	6	7	$7\frac{1}{2}$
D Thickness of Flanges,.....Inches	.....	$\frac{3}{4}$	$1\frac{1}{8}$	$\frac{3}{4}$	$\frac{7}{8}$	$1\frac{1}{8}$	$\frac{1}{2}$	$\frac{7}{8}$	$1\frac{1}{8}$	$\frac{3}{4}$
E Face to Face Screw Ends,.....Inches	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$
J Height of Flange End Valve,.....Inches	.....	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$7\frac{1}{4}$
K Height of Screw End Valve,.....Inches	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{1}{4}$	$5\frac{1}{8}$	$6\frac{1}{8}$

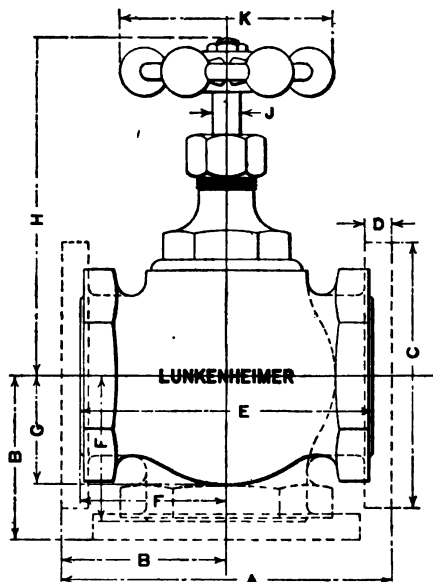
The above dimensions refer to valves shown on page 62.

All genuine valves have the name LUNKENHEIMER cast on the valve body

**LUNKENHEIMER
IRON BODY BRASS MOUNTED GLOBE
ANGLE AND CROSS VALVES.**

Without Yoke.

Medium Pattern, for 125 Pounds Working Pressure.



LEADING DIMENSIONS.

Size of Valve,.....inches	1	1½	1¾	2	2½	3
A Face to Face Flange End Globe Valve.....inches	5½	6¾	7½	8½	9¾	
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve.....inches	2¾	3¾	3¾	4¾	4¾	
C Diameter of Flanges.....inches	4½	5	6	7	7½	
D Thickness of Flanges.....inch	½	¾	¾	¾	¾	¾
E Face to Face Screw End Globe Valve.....inches	4½	4¾	5½	6½	7½	8½
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve.....inches	2½	2½	2½	3½	3½	4½
G Center of Port to Bottom of Body.....inches	1½	1½	2	2½	2½	3½
H Center of Port to Top of Stem—When Open.....inches	5½	6¾	7½	8½	9¾	10½
H Center of Port to Top of Stem—When Closed.....inches	5¾	6¾	6¾	7¾	8¾	9¾
J Diameter of Stem.....inch	1½	1½	1½	1½	1½	1½
K Diameter of Hand Wheel.....inches	3¾	3½	4	4¾	5½	6

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 64 and 65.

All genuine valves have the name LUNKENHEIMER cast on the body.

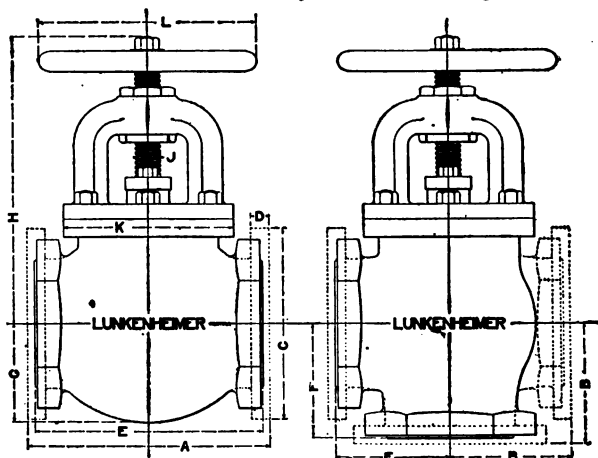
THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

LUNKENHEIMER GLOBE, ANGLE AND CROSS VALVES.

Flanged Hub. Outside Screw and Yoke.

Iron Body Brass Mounted.

Medium Pattern. For 125 Pounds Working Pressure.



LEADING DIMENSIONS.

Size of Valve,.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
A Face to Face Flange End Globe Valve,.....inches	7½	8½	9½	10½	11	12	12¾	14½	16½	19½	24¾	27½
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve,.....inches	3¾	4¾	4¾	5½	5½	6	6¾	7½	8½	8¾	10½	12
C Diameter of Flanges,.....inches	6	7	7½	8½	9	9¾	10	11	12½	13½	16	19
D Thickness of Flanges,.....inches	¾	1	¾	1	1	1	1	1	1½	1½	1½	1½
E Face to Face Screw End Globe Valve,.....inches	6½	7½	8½	9	10	11½	12	13½	15½	18	23¾	27
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,.....inches	3½	3½	4½	4½	5	5½	6	6¾	7¾	8¾	10	11½
G Center of Port to Bottom of Body,.....inches	2½	2½	3¾	3¾	4½	4½	5½	5¾	6¾	7¾	9	10½
H Center of Port to Top of Stem—When Open,.....inches	9½	10½	11½	13¾	14½	15½	17	18½	20½	22½	26¾	30½
H Center of Port to Top of Stem—When Closed,.....inches	8½	9¾	10¾	12	13½	14	15½	16¾	17¾	19½	23¾	26
J Diameter of Stem,.....inches	¾	¾	1	1½	1½	1½	1½	1¾	1¾	1¾	2	2½
K Diameter of Body and Yoke Flanges,.....inches	4½	5½	5½	6½	7½	8½	8½	10½	11½	13	15½	17½
L Diameter of Handwheel,.....inches	5½	6	7	8	9	9	10	12	14	16	18	20

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 68, 69, 148 and 149.

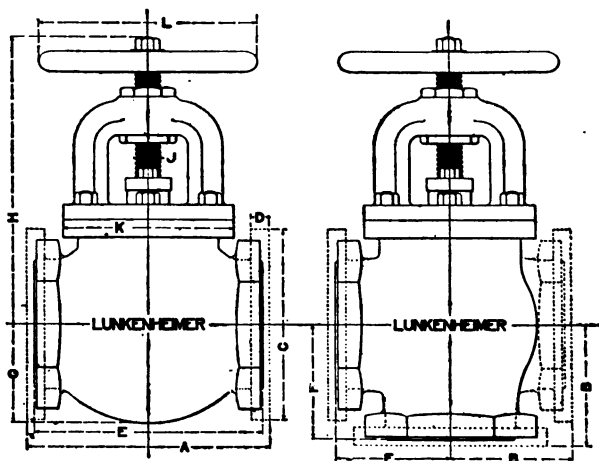
All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Flanged Hub, Outside Screw and Yoke.

Iron Body Brass Mounted.

Heavy Pattern for 150 Pounds Working Pressure.



LEADING DIMENSIONS.

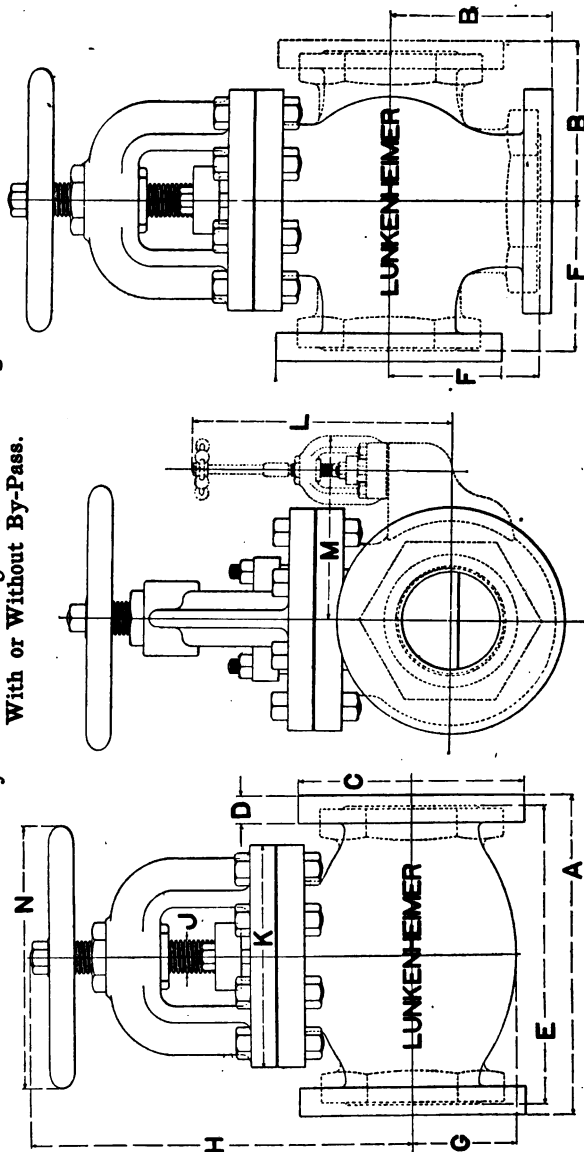
Size of Valve,.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
A Face to Face Flange End Globe Valve,.....inches	8	9½	10	11	11½	12¾	13½	15	17	20¾	24¾	27¾
B Center to Face of Inlet or Outlet of Flange End Angle or Cross Valve,.....inches	4¾	5	5½	6½	6¾	6¾	7¾	8½	9	9½	11¼	12¾
C Diameter of Flanges,.....inches	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20
D Thickness of Flanges,.....inches	7½	1	1½	1¾	1¾	1¾	1¾	1¾	1½	1½	2	2
E Face to Face Screw End Globe Valve,.....inches	5½	7½	8½	9	10	11½	12	13½	15½	18	23½	27
F Center to Face of Inlet or Outlet of Screw End Angle or Cross Valve,.....inches	3½	3½	4½	4½	5	5½	6	6¾	7½	8½	10	11½
G Center of Port to Bottom of Body,.....inches	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	9	10½
H Center of Port to Top of Stem—When Open,.....inches	9¾	10½	11½	13½	14½	15½	17	18½	20¾	22¾	26½	30½
Center of Port to Top of Stem—When Closed,.....inches	8½	9¾	10½	12	13½	14	15½	16½	17½	19½	23½	26
J Diameter of Stem,.....inches	8	8½	1	1½	1½	1½	1½	1½	1½	1½	2	2½
K Diameter of Body and Yoke Flanges,.....inches	4½	5½	5½	6½	7½	8½	8½	10½	11½	13	15½	17½
L Diameter of Handwheel,.....inches	5½	6	7	8	9	9	10	12	14	16	18	20

Angle and Cross Patterns shown in dotted lines.

The above dimensions refer to valves shown on pages 70, 71, 150 and 151.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER GLOBE, ANGLE AND CROSS VALVES.

Flanged Hub. Outside Screw and Yoke.
Iron Body Brass Mounted, and Semi-Steel Body Nickel Mounted.
Extra Heavy Pattern. For 250 Pounds Working Pressure.
With or Without By-Pass.



For leading dimensions see opposite page.

LUNKENHEIMER
GLOBE, ANGLE AND CROSS VALVES.

Flanged Hub. Outside Screw and Yoke.

Iron Body Brass Mounted and Semi-Steel Body Nickel Mounted.

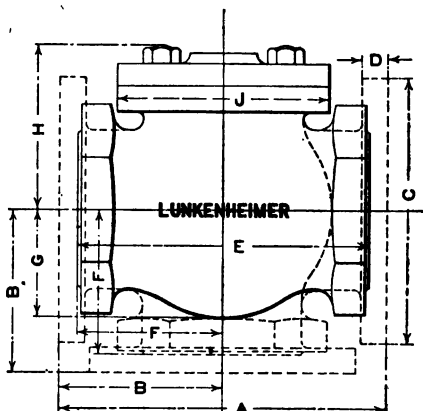
For 250 Pounds Working Pressure. With or Without By-Pass.

LEADING DIMENSIONS.

Size of Valve,.....inches		2	2½	3	3½	4	4½	5	6	7	8	10	12
A	Face to Face Flange End Globe Valve,.....inches	9¾	11½	12½	13½	14	15	15¾	17½	19¾	21¾	25¾	28½
B	Center to Face of Inlet or Outlet of Flange End, Angle or Cross Valve,.....inches	4¾	5¾	6¾	6¾	7	7¾	7¾	8¾	9¾	10¾	12¾	14
C	Diameter of Flanges,.....inches	6¾	7¾	8¾	9	10	10¾	11	12½	14	15	17½	20
D	Thickness of Flanges,.....inches	¾	1	1½	1½	1½	1½	1½	1½	1½	1½	1½	2
E	Face to Face Screw End Globe Valve,.....inches	8½	10½	11¾	12¾	13	14	14¾	16¾	18¾	20	23¾	27¾
F	Center to Face of Inlet or Outlet of Screw End, Angle or Cross Valve,.....inches	4¾	5¾	5¾	6¾	6¾	7	7¾	8¾	9¾	10	11¾	13¾
G	Center of Port to Bottom of Body,.....inches	2½	3½	3½	4	4½	4¾	5¾	6½	7	7½	10½	12¾
H	Center of Port to Top of Stem—When Open,.....inches	13¾	14¾	16¾	17¾	19¾	20¾	22	24	27¾	29¾	35¾	40¾
	Center of Port to Top of Stem—When Closed,.....inches	12¾	13¾	15	16¾	17¾	18¾	19¾	21¾	24¾	26¾	31¾	35¾
J	Diameter of Stem,.....inches	¾	1½	1½	1½	1½	1½	1½	1½	1½	1½	2½	2½
K	Diameter of Body and Yoke Flanges,.....inches	6½	7½	7¾	8¾	9¾	10¾	11	12½	14¾	15¾	18½	20½
L	Center of Port to Top of By-Pass Stem—When Open,.....inches							13¾	15¾	17¾	18¾	22¾	25¾
	Center of Port to Top of By-Pass Stem—When Closed,.....inches							13¾	14¾	16¾	18¾	21¾	24¾
M	Center to End of By-Pass,.....inches							9¾	10¾	11¾	13¾	15½	17¾
N	Diameter of Handwheel,.....inches	8	9	10	12	14	14	16	18	20	22	26	30

*The above dimensions refer to valves on pages 72 to 79, 152 and 153.
All genuine valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER
Iron Body Brass Mounted
HORIZONTAL AND ANGLE CHECK VALVES.
Medium Pattern. For 125 Pounds Working Pressure.



LEADING DIMENSIONS.

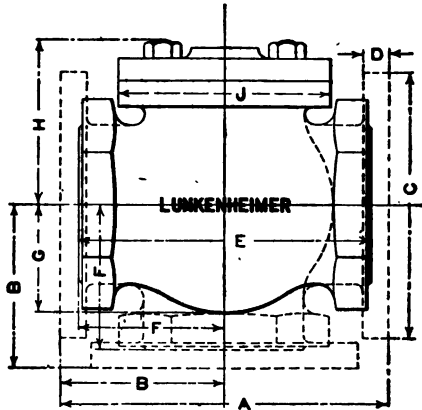
Size of Valve, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
A Face to Face Flange Ends, Horizontal Valve, .....inches	7½	8½	9½	10½	11	12	12¾	14½	16½	19½	24½	27½
B Center to Face of Inlet or Outlet of Flange End Angle Valve, .....inches	3¾	4¾	4¾	5¾	5½	6	6¾	7½	8½	8¾	10½	12
C Diameter of Flanges, .....inches	6	7	7½	8½	9	9¾	10	11	12½	13½	16	19
D Thickness of Flanges, .....inches	¾	1¼	¾	1¼	1¼	1¼	1¼	1	1½	1½	1½	1¼
E Face to Face Screw End Horizontal Valve, .....inches	6½	7½	8½	9	10	11½	12	13½	15½	18	23½	27
F Center to Face of Inlet or Outlet of Screw End Angle Valve, .....inches	3½	3½	4½	4½	5	5½	6	6½	7½	8½	10	11½
G Center of Port to Bottom of Body, .....inches	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	9	10½
H Center of Port to Top of Valve, .....inches	3½	4½	5	5½	6½	6½	7½	7½	8½	9½	11½	13½
J Diameter of Body and Cap Flanges, .....inches	4½	5½	5½	6½	7½	8½	8½	10½	11½	13	15½	17½

The above dimensions refer to valves shown on pages 82 and 83.

Angle pattern shown in dotted lines.

All genuine valves have the name LUNKENHEIMER cast on same.

LUNKENHEIMER
Iron Body Brass Mounted
HORIZONTAL AND ANGLE CHECK VALVES.
Heavy Pattern. For 150 Pounds Working Pressure.



LEADING DIMENSIONS.

Size of Valve, .....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
A Face to Face Flange Ends, Horizontal Valve,..... inches	8	9½	10	11	11½	12¾	13¾	15	17	20¼	24¼	27¾
B Center to Face of In. or Outlet of Flange End Ang. or Cross Val., in.	4¾	5	5½	6¼	6½	6½	7¼	8½	9	9½	11¼	12¾
C Diameter of Flanges, .....inches	6½	7½	8¾	9	10	10½	11	12½	14	15	17½	20
D Thickness of Flanges, .....inches	¾	1	1½	1½	1½	1½	1¾	1¾	1¾	1¾	1¾	2
E Face to Face Screw End Horizontal Valve, .....inches	6½	7½	8½	9	10	11½	12	13½	15½	18	23¼	27
F Cen. to Face of In. or Out. of Screw End Angle or Cross Valve, inches	3½	3½	4½	4½	5	5½	6	6¾	7½	8½	10	11½
G Center of Port to Bottom of Body, .....inches	2½	2½	3¾	3¾	4½	4½	5½	5½	6½	7½	9	10½
H Center of Port to Top of Valve, .....inches	3¾	4½	5	5¾	6¼	6½	7½	7½	8½	9½	11¼	13¾
J Diameter of Body and Cap Flanges,..... inches	4½	5½	5½	6½	7½	8½	8½	10½	11½	13	15½	17½

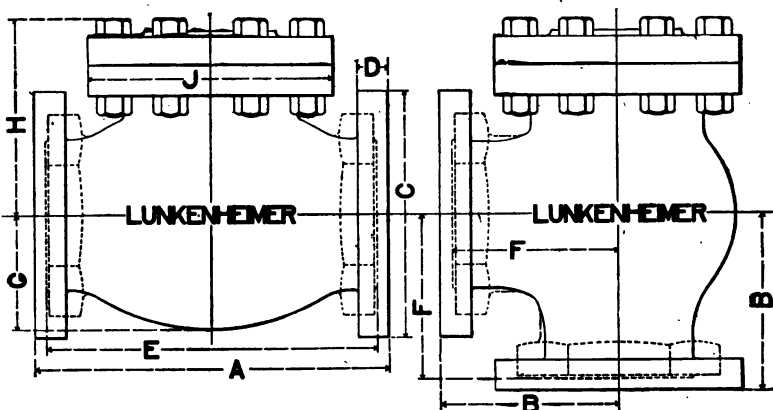
The above dimensions refer to valves shown on pages 84 and 85.
Angle pattern shown in dotted lines.
All genuine valves have the name LUNKENHEIMER cast on the bodies.

LUNKENHEIMER
HORIZONTAL AND ANGLE CHECK VALVES.

Iron Body Brass Mounted.

Extra Heavy Pattern.

For 250 Pounds Working Pressure.



LEADING DIMENSIONS.

Size of Valve,.....inches	2	2½	3	3½	4	4½	5	6	7	8	10	12
A Face to Face Flange End Horizontal Valve,.....inches	9¾	11½	12¾	13¾	14	15	15¾	17½	19¾	21¾	25¾	28¾
B Center to Face of Inlet or Outlet of Flange End Angle Valve,.....inches	4¾	5¾	6¾	6¾	7	7½	7¾	8¾	9¾	10¾	12¾	14
C Diameter of Flanges,.....inches	6½	7½	8¾	9	10	10½	11	12½	14	15	17½	20
D Thickness of Flanges,.....inches	¾	1	1½	1½	1¾	1¾	1¾	1¾	1¾	1¾	1¾	2
E Face to Face Screw End Horizontal Valve,.....inches	8¾	10¾	11¾	12¾	13	14	14¾	16¾	18¾	20	23¾	27¾
F Center to Face of Inlet or Outlet of Screw End Angle Valve,.....inches	4¾	5¾	5¾	6¾	6¾	7	7½	8¾	9¾	10	11¾	13¾
G Center of Port to Bottom of Body,.....inches	2½	3¾	3¾	4	4½	4¾	5¾	6¾	7	7½	10¾	12¾
H Center of Port to Top of Valve,.....inches	5¾	5¾	6¾	7	7¾	8¾	8¾	9¾	11¾	12¾	14¾	16¾
J Diameter of Body and Cap Flanges,.....inches	6½	7½	7¾	8¾	9¾	10¾	11	12¾	14¾	15¾	18¾	20¾

The above dimensions refer to valves shown on pages 86 and 87.

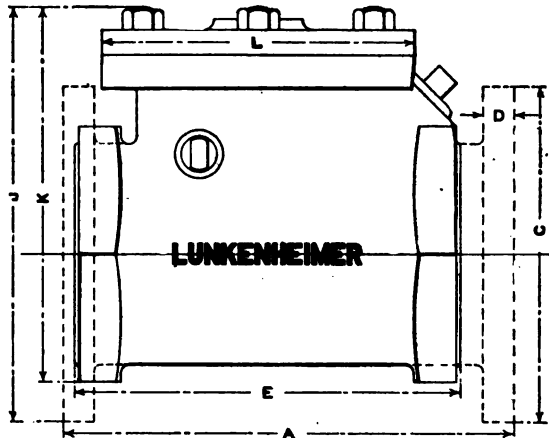
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER **REGRINDING SWING CHECK VALVES.**

Medium Pattern.

For 125 Pounds Working Pressure.

Iron Body Brass Mounted or all Iron.



LEADING DIMENSIONS.

Size of Valve,.....inches	2	2½	3	3½	4	4½	5	6	7	8
A Face to Face Flange Ends, inches	8	9	9½	10½	11½	12½	13½	14½	16½	17½
C Diameter of Flanges,.....inches	6	7	7½	8½	9	9½	10	11	12½	13½
D Thickness of Flanges,.....inches	¾	1½	¾	1½	1½	1½	1½	1	1½	1½
E Face to Face Screw Ends,.....inches	5½	7¼	8½	9	9½	10½	11½	12½	14½	15½
J Height of Flange End Valve,.....inches	7¼	8¾	9½	10½	11½	11½	12½	13½	15½	17
K Height of Screw End Valve,.....inches	6½	7½	8½	9½	10	10½	11½	12½	14½	15½
L Diameter of Body and Cap Flanges,.....inches	5½	6	6½	7½	8½	8½	9½	10½	11½	13½

The above dimensions refer to valves shown on page 88.

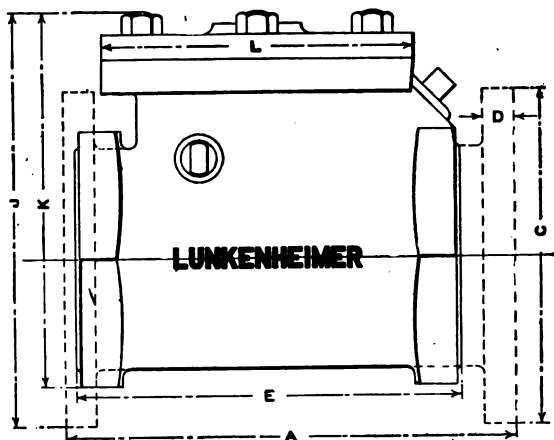
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
REGRINDING SWING CHECK VALVES.

Heavy Pattern.

For 150 Pounds Working Pressure.

Iron Body Brass Mounted.



LEADING DIMENSIONS.

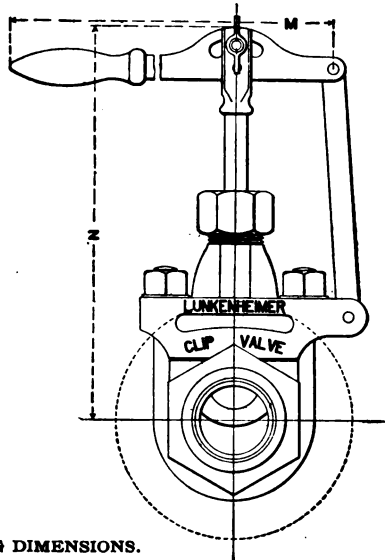
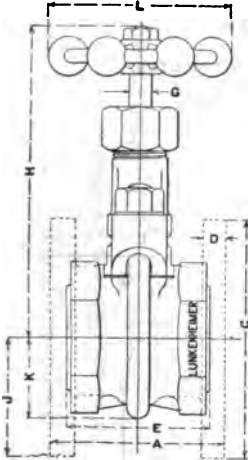
Size of Valve,.....inches	2	2½	3	3½	4	4½	5	6	7	8
A Face to Face Flange Ends,.....inches	9½	10½	11½	12½	13½	14½	15½	16½	18½	20½
C Diameter of Flanges,.....inches	6½	7½	8½	9	10	10½	11	12½	14	15
D Thickness of Flanges,.....inches	¾	1	1½	1½	1½	1½	1½	1½	1½	1½
E Face to Face Screw Ends,.....inches	5½	7½	8½	9	9½	10½	11½	12½	14½	15½
J Height of Flange End Valve,.....inches	8	9	10	10½	11½	12½	13½	14½	16½	17½
K Height of Screw End Valve,.....inches	6½	7½	8½	9½	10	10½	11½	12½	14½	15½
L Diameter of Body and Cap Flanges,.....inches	5½	6	6½	7½	8½	8½	9½	10½	11½	13½

The above dimensions refer to valves shown on page 89.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
"CLIP" GATE VALVES.

Standard and Quick Opening Patterns.
Iron Body Brass Mounted or All Iron.



LEADING DIMENSIONS.

Size of Valve,.....inches	½	¾	1	1½	2	2½	3	3½	4	4½	5	6
A Face to Face Flange Ends, in.					4	4½	5½	6½	6½	7½	8½	8½
C Diameter of Flanges,.....inches					6	7	7½	8½	9	9½	10	11
D Thickness of Flanges,.....inches					½	¾	¾	¾	¾	¾	¾	¾
E Face to Face Screw Ends,.....inches	2½	2½	2½	2½	3	3½	4½	4½	5½	5½	6½	7½
G Diameter of Stem,.....inches	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
H Center of Port to Top of Stem—When Open,.....inches	4½	5½	6½	7½	8½	9½	12½	14½	17½	19½	21½	27½
Center of Port to Top of Stem—When Closed,.....inches	4½	4½	5½	5½	6½	7½	10½	11½	13½	15½	17	18½
J Center of Port to Bottom of Flange,.....inches					3	3½	3½	4½	4½	4½	5	5½
K Center of Port to Bottom of Screw End Body,.....inches	¾	1½	1½	1½	1½	2½	2½	3	3½	4½	4½	5½
L Diameter of Hand Wheel,.....in.	2	2½	2½	3½	3½	4	4½	5½	6	7	8	9
M Fulcrum to End of Lever,.....in.	7½	7½	8½	8½	9½	11½	15½	18½	19½	21½	23½	27½
N Center of Port to Top of Lever Fork—When Open,.....inches	6½	6½	7½	8½	9½	11½	14½	16½	19½	22½	23½	29½
Center of Port to Top of Lever Fork—When Closed,.....inches	5½	5½	6½	7½	7½	9	12½	13½	15½	18½	19	20½

*The above dimensions refer to valves shown on pages 91 to 93.
All genuine valves have the name LUNKENHEIMER cast on body.*

LUNKENHEIMER
"VICTOR" GATE VALVES.

Stationary Stem.

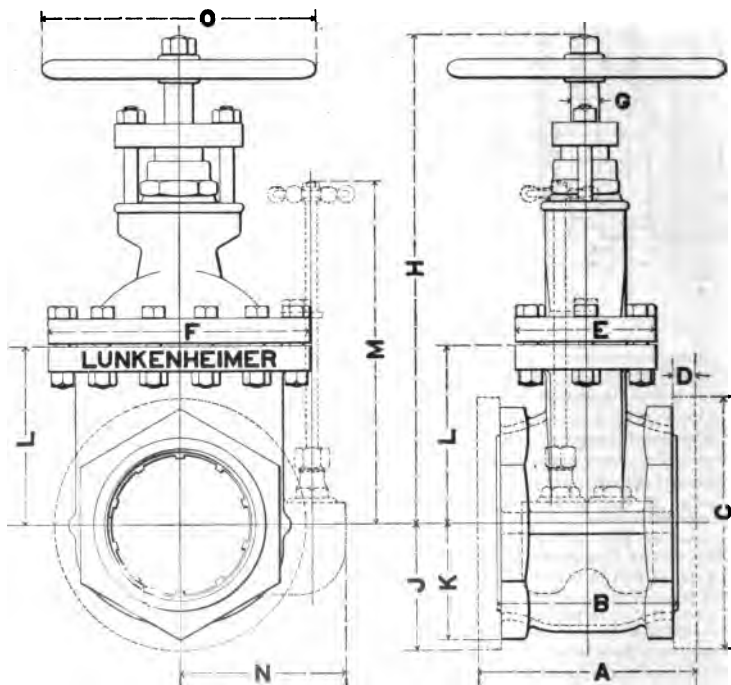
With and Without By-Pass.

Medium and Heavy Patterns.

For 125 and 150 Pounds Working Pressures.

Iron Body Brass Mounted or All Iron.

Screw or Flange Ends.



For leading dimensions see opposite page.

LUNKENHEIMER

"VICTOR" GATE VALVES.

Stationary Stem. With and Without By-Pass.

Medium and Heavy Patterns. For 125 and 150 Pounds Working Pressures.

Iron Body Brass Mounted or All Iron. Screw or Flange Ends.

LEADING DIMENSIONS.

Size of Valve,	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
A Face to Face Flange (Standard Dimensions),	5	5½	6½	6½	7½	7½	8½	9½	10½	11½	12½	14½	15	16½	16½	18½
Ends,	6	7	7½	8	8½	9	9½	10½	10½	12½	13½	14	15½	16½	18	20½
B Face to Face Screw Ends,	4½	5½	5½	5½	5½	6	6½	7½	7½	9½	10½	11½	13	14½	14½	16½
C Diameter of Flanges,	6	7	7½	8	9	9½	10	11	12½	13½	15	16	19	21	22½	23½
D Thickness of Flanges,	5	5½	6	6½	7	7½	8	9	10	10½	11	12½	14	15	16	17½
E Width of Body and Cap Flanges,	3	3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13
F Length of Body and Cap Flanges,	5½	6	6½	7	7½	8	8½	9	9½	10½	11½	13	14½	16	17½	20
G Diameter of Stem,	5	5½	6	6½	7	7½	8	9	10	11	12	13	14	15	16	17½
H Center of Port to Top of Stem,	10	13	15	16½	17½	18	20	22½	24½	26½	28½	31½	35	38½	40	42½
I Center of Port to Bottom of Stem,	3	3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13
J Bottom of Flange,	3	3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13
K Center of Port to Bottom of Screw End Body,	2½	2½	3	3½	3½	4	4½	4½	5	5½	6	6½	7	7½	8	9
L Center of Port to Top of Valve Body,	3	3½	4	4½	5	5½	6	6½	7	7½	8	9	10	11	12	13
M Center of Port to Top of Open By-Pass Stem,	14½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½	16½
N Center to End of By-Pass,	13½	15½	16	16	16	16	16	16	16	16	16	16	16	16	16	16
O Diameter of Hand Wheel,	5½	6	7	8	9	10	12	12	12	14	14	14	16	18	20	22

The above dimensions refer to valves shown on pages 98, 99, 102, 104 and 106.

All genuine valves have the name LUNKENHEIMER cast on the body.

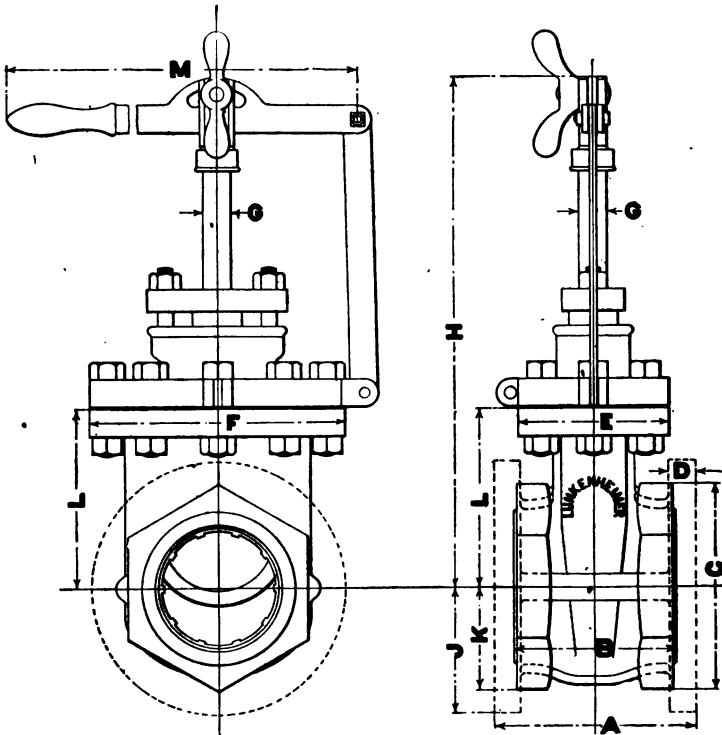
LUNKENHEIMER
"VICTOR" GATE VALVES.

Quick Opening Pattern.

Medium Pattern. For 125 Pounds Working Pressure.

Iron Body Brass Mounted or all Iron.

Screw Ends or Standard Flange Ends.



For Leading dimensions see opposite page.

LUNKENHEIMER

"VICTOR" GATE VALVES.

Quick Opening Pattern.

Medium Pattern for 125 Pounds Working Pressure. Iron Body Brass Mounted or All Iron.

Screw Ends or Standard Flange Ends.

LEADING DIMENSIONS.

Size of Valve,	inches	2	3	4	5	6	7	8	9	10	12	14	15	16
A Face to Face Flange Ends,	inches	5	5½	6½	7½	8½	9½	10½	11½	12½	14½	15	16½	18½
B Face to Face Screw Ends,	inches	4½	5½	6½	7½	8½	9½	10½	11½	12½	14½	15	16½	18½
C Diameter of Standard Flanges,	inches	6	7	7½	8½	9	9½	10	11	12½	13½	15	16	19
D Thickness of Flanges,	inches	5	1	¾	1	1	1	1	1	1	1	1	1	1
E Width of Body and Cap Flanges,	inches	4½	4	4	4	4	4	4	4	4	4	4	4	4
F Length of Body and Cap Flanges,	inches	5½	6	7	8	9	10	11	12	13	14	15	16	17
G Diameter of Stem,	inches	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
H Center of Port to Top of Lever Fork,	inches	12½	14	16	17	18	19	20	21	22	23	24	25	26
J Center of Port to Bottom of Standard Flange,	inches	10½	12	13	14	15	16	17	18	19	20	21	22	23
K Center of Port to Bottom of Screw End Body,	inches	3	3	3	3	3	3	3	3	3	3	3	3	3
L Center of Port to Top of Valve Body,	inches	37	4	5	6	7	8	9	10	11	12	13	14	15
M Fulcrum to End of Lever,	inches	15½	16	18	19	21	23	25	27	30	34	36	40	48

The above dimensions refer to valves shown on page 100.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
"VICTOR" GATE VALVES.

With Rising Stem and Yoke.

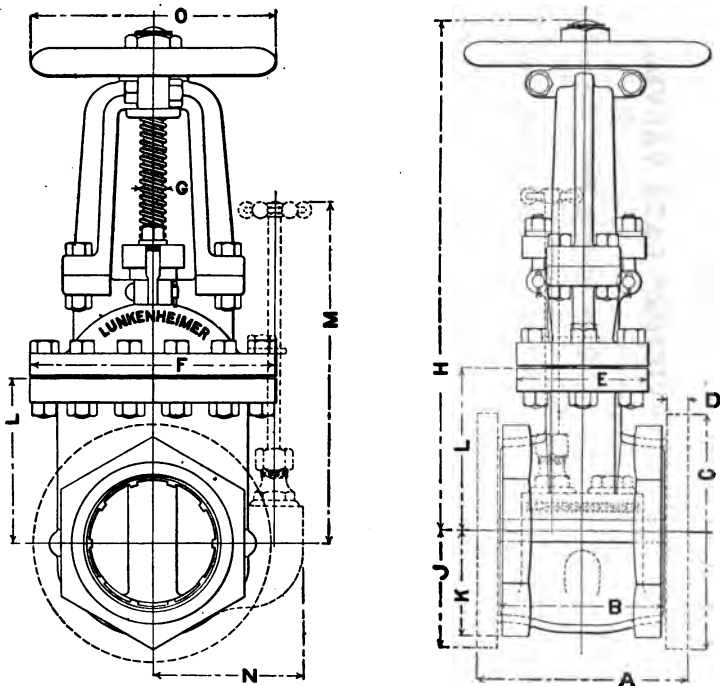
Medium and Heavy Patterns.

For 125 and 150 Pounds Working Pressures.

With and Without By-Pass.

Iron Body Brass Mounted.

Screw or Flange Ends.



For leading dimensions see opposite page.

"VICTOR," GATE VALVES.

With Rising Stem and Yoke. Iron Body Brass Mounted. Medium and Heavy Patterns.

For 125 and 150 Pounds Working Pressures.

Screw or Flange Ends. With or Without By-Pass.

LEADING DIMENSIONS.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Size of Valves, .....inches.....																
A Face to Face Flange { Standard Dimensions, .....inches	5	5 1/2	6 1/8	7 1/8	8 1/8	9 1/8	10 1/8	11 1/8	12 1/8	14 1/8	15 1/8	16 1/8	18 1/8	18 1/8	20 1/8	20 1/8
B Face to Face Screw Ends, .....inches	4 1/2	5 1/2	6 1/8	7 1/8	8 1/8	9 1/8	10 1/8	11 1/8	12 1/8	14 1/8	15 1/8	16 1/8	18 1/8	18 1/8	20 1/8	20 1/8
C Diameter of Flanges, { Standard Dimensions, .....inches	6	7	7 1/8	8 1/8	9	10	10 1/8	11	12 1/8	13 1/8	15	16	19	21	22 1/8	23 1/8
D Thickness of Flanges, { Standard Dimensions, .....inches	5/8	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2 1/8	2 1/4	2 1/2	2 3/4	2 3/4	3 1/8	3 1/8
E Width of Body and Cap Flanges, .....inches	2 1/2	3 1/4	4 1/4	5 1/4	6 1/4	7 1/4	8 1/4	9 1/4	10 1/4	12 1/4	13 1/4	14 1/4	16 1/4	18 1/4	20 1/4	20 1/4
F Length of Body and Cap Flanges, .....inches	5 1/2	6 1/2	7 1/2	8 1/2	9 1/2	10 1/2	11 1/2	12 1/2	13 1/2	15 1/2	16 1/2	17 1/2	20 1/2	22 1/2	23 1/2	24 1/2
G Diameter of Stem, .....inches	3/4	7/8	1	1 1/8	1 1/4	1 1/2	1 3/4	1 7/8	2 1/8	2 1/4	2 1/2	2 3/4	2 3/4	3 1/8	3 1/8	3 1/8
H Center of Port to Top of Stem, { Open, .....inches	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2	23 1/2	25 1/2	27 1/2	30 1/2	34 1/2	39 1/2	43 1/2	47 1/2	54 1/2	60 1/2	70 1/2
I Center of Port to Bottom of Valve Body, .....inches	10 1/2	12 1/2	14 1/2	16 1/2	18 1/2	20 1/2	22 1/2	24 1/2	27 1/2	30 1/2	34 1/2	39 1/2	43 1/2	47 1/2	54 1/2	60 1/2
K Center of Port to Bottom of Screw End Body, inches	2 1/2	3 1/4	4 1/4	5 1/4	6 1/4	7 1/4	8 1/4	9 1/4	10 1/4	12 1/4	13 1/4	14 1/4	16 1/4	18 1/4	20 1/4	20 1/4
L Center of Port to Top of Valve Body, .....inches	3 1/2	4 1/2	5 1/2	6 1/2	7 1/2	8 1/2	9 1/2	10 1/2	11 1/2	13 1/2	14 1/2	15 1/2	17 1/2	19 1/2	21 1/2	23 1/2
M Center of Port to Top of Open By-Pass Stem, .....inches	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N Center to End of By-Pass, .....inches	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
O Diameter of Hand Wheel, .....inches	5 1/2	6	7	8	9	10	12	12	14	14	16	18	20	20	22	22

The above dimensions refer to valves shown on pages 101-103-105 and 107. All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
"VICTOR" GATE VALVES.

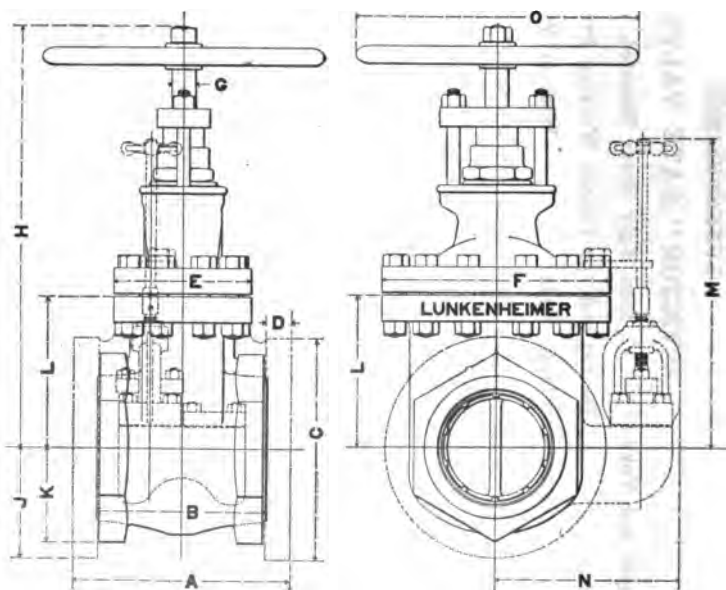
Stationary Stem.

Extra Heavy Pattern.

For 250 Pounds Working Pressure.

With or Without By-Pass.

Iron Body Brass Mounted. Screw or Flange Ends.



For leading dimensions see opposite page.

LUNKENHEIMER

"VICTOR" GATE VALVES.

Stationary Stem. Iron Body Brass Mounted. Extra Heavy Pattern.
For 250 Pounds Working Pressure.

Screw or Flange Ends. With or Without By-Pass.

LEADING DIMENSIONS.

Size of Valve.	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	14	15	16
A. Face to Face Flange Ends,.....	inches	5½	6½	7½	8½	9	9½	10½	12½	13½	15	16½	19	19½	21½	22½
B. Face to Face Screw Ends,.....	inches	4½	5½	6½	7½	8½	9½	10½	12½	13½	15½	17½	20	22½	23½	25
C. Diameter of Flanges,.....	inches	6	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20	22½	23½
D. Thickness of Flanges,.....	inches	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
E. Width of Body and Cap Flanges,.....	inches	4½	4½	5½	5½	6	6½	7½	7½	8½	9½	10½	11½	12½	13½	13½
F. Length of Body and Cap Flanges,.....	inches	5½	7	8	8½	9	10½	10½	11½	13	14½	15½	18½	21½	23½	25½
G. Diameter of Stem,.....	inches	¾	¾	¾	¾	¾	1	1	1	1	1	1	1	1	1	1
H. Center of Port to Top of Stem, ..	inches	10½	12	14	15	16½	18½	19½	22½	24	26	28½	32½	36½	40½	43
J. Center of Port to Bottom of Flange,.....	inches	3	3½	3½	4½	4½	5	5½	6½	7	7½	8½	10	11½	11½	12½
K. Center of Port to Bottom of Screw End Body, inches	inches	1½	2½	2½	3½	3½	4½	4½	5½	6½	6½	8½	9½	11½	13½	15½
L. Center of Port to Top of Valve Body,	inches	4½	4½	5½	5½	6½	7½	7½	8½	9½	10½	10½	13½	14½	15½	16½
M. Center of Port to Top (Open,	inches	.....	.....	.....	.....	.....	.....	15½	18½	19½	21½	26½	30	33½	35½	38½
N. Center to End of By-Pass,	inches	.....	.....	.....	.....	.....	.....	15½	17½	19½	21½	25½	29	32½	34½	37½
O. Diameter of Hand Wheel,.....	inches	7	8	9	9	10	12	14	16	16	18	20	22	24	24	26

The above dimensions refer to valves shown on pages 108 and 110.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
"VICTOR" GATE VALVES.

With Rising Stem and Yoke.

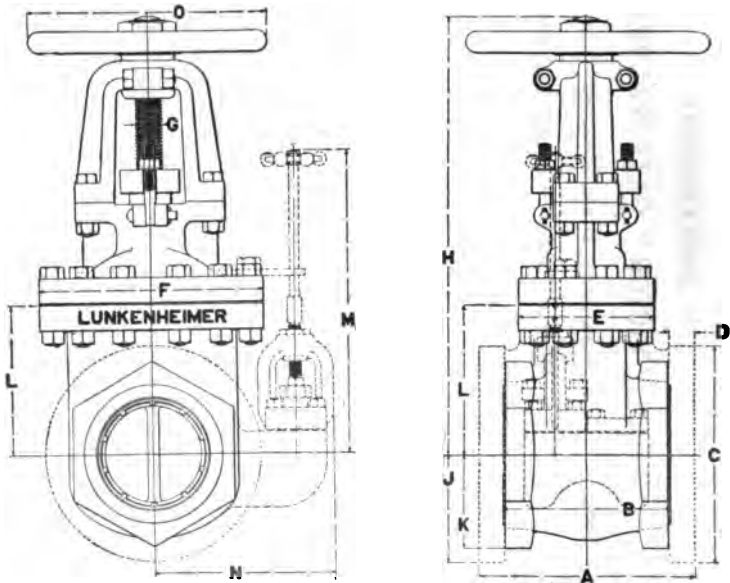
Extra Heavy Pattern.

For 250 Pounds Working Pressure.

With or Without By-Pass.

Iron Body Brass Mounted.

Screw or Flange Ends.



For leading dimensions see opposite page.

LUNKENHEIMER

"VICTOR" GATE VALVES.

With Rising Stem and Yoke.

Extra Heavy Pattern.

For 250 Pounds Working Pressure.

With or Without By-Pass.

Iron Body Brass Mounted.

Screw or Flange Ends.

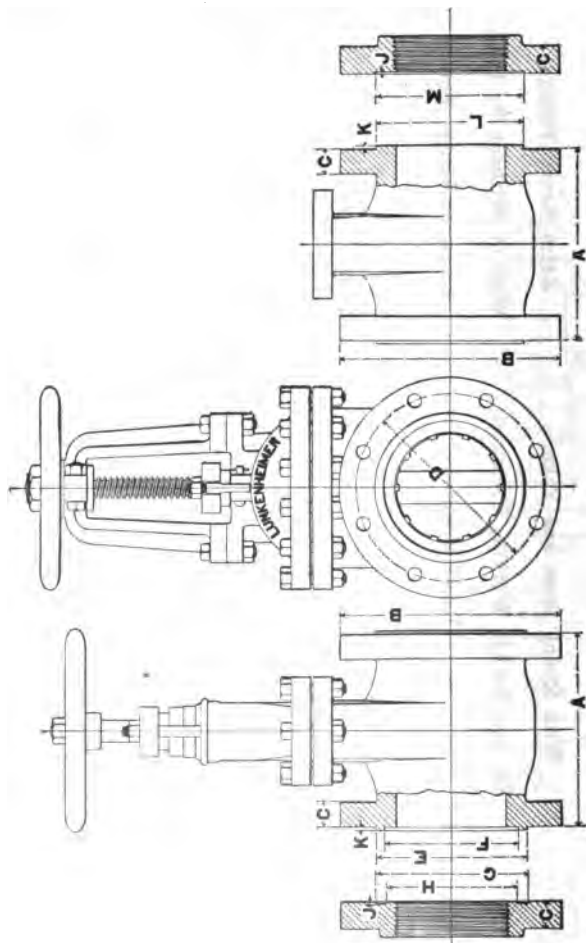
LEADING DIMENSIONS.

Size of Valve,	1½	2	2½	3	3½	4	4½	5	6	7	8	10	12	14	15	16
A. Face to Face Flange Ends,.....inches	5½	6½	7½	8½	9	9½	10½	12½	13½	15	16½	19	19½	21½	22½	24
B. Face to Face Screw Ends,.....inches	4½	5½	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20	22½	25
C. Diameter of Flanges,.....inches	6	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20	22½	23½	25
D. Thickness of Flanges,.....inches	1½	2	2½	3	3½	4	4½	5	5½	6	6½	7	7½	8	8½	9
E. Width of Body and Cap Flanges,.....inches	4½	5½	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20	22½	25
F. Length of Body and Cap Flanges,.....inches	5½	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20	22½	23½	25
G. Diameter of Stem,.....inches	5	5½	6	6½	7	7½	8	8½	9	10	10½	11	12½	14	15	16
H. Center of Port to Top of Stem,.....inches	12½	14½	16½	18½	21	23½	25½	27½	32½	35½	39½	47½	55½	62½	66½	71
I. Center of Port to Bottom of Flange,.....inches	10½	12½	14½	16½	19	20½	22½	25½	28½	31½	37	43	48½	51	54½	59½
J. Center of Port to Bottom of Screw End Body,.....inches	3	3½	4	4½	5	5½	6	6½	7	7½	8½	10	11½	13½	15½	17½
K. Center of Port to Bottom of Valve Body,.....inches	1	1½	2	2½	3	3½	4	4½	5	5½	6½	8	9½	11½	13½	15½
L. Center of Port to Top of Valve Body,.....inches	4½	5½	6½	7½	8½	9	10	10½	11	12½	14	15	17½	20	22½	25
M. Center of Port to Top of By-Pass Stem,.....inches	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. Center to End of By-Pass,.....inches	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
O. Diameter of Handwheel,.....inches	7	8	9	9	10	12	12	14	16	16	18	20	22	24	24	26

The above dimensions refer to valves shown on pages 109 and 111.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
"VICTOR" GATE VALVES.

Heavy and Extra Heavy Patterns.
For 150 and 250 Pounds Working Pressures.
With Tongued and Grooved Flanges.



For leading dimensions see opposite page.

LUNKENHEIMER

“VICTOR” GATE VALVES.

Heavy and Extra Heavy Patterns.

For 150 and 250 Pounds Working Pressure.

With Tongued and Grooved Flanges.

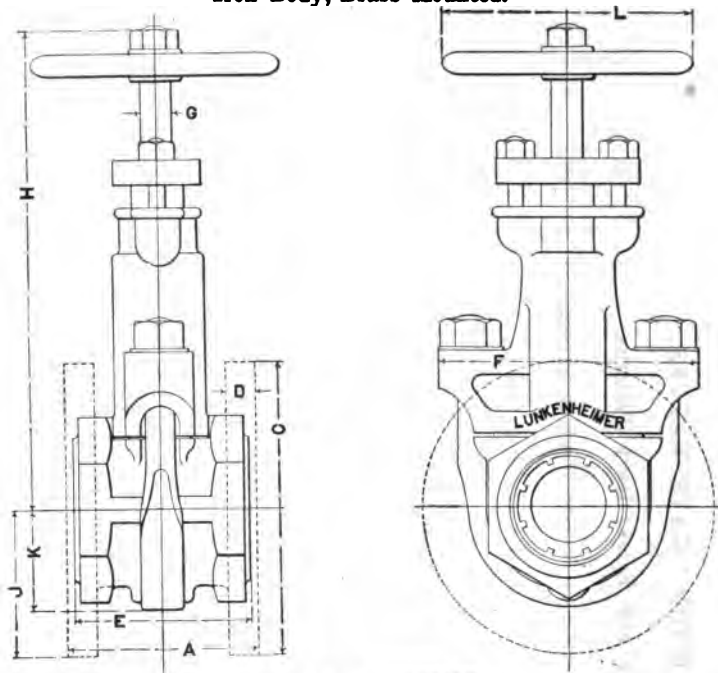
LEADING DIMENSIONS.

Size of Valve,	inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12	14	15	16
A Face to Face,.....	Heavy,.....	6½	7½	8½	9	9½	10½	10½	10½	12½	13½	14	15½	16½	18	18½	20½
	Extra Heavy,.....	6½	7½	8½	9	9½	10½	12½	13½	15	16½	19	19½	21½	22½	24	
B Diameter of Flanges,.....		6½	7½	8½	9	9½	10½	11	12½	14	15	16	17½	20	22½	23½	25
C Thickness of Flanges,.....		3½	1	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	2	2½	2½	2½
D Diameter of Bolt Circles,.....		5	5½	6½	7½	7½	8½	9½	10½	11½	13	14	15½	17½	20	21	22½
E Outside Diameter of Tongue,.....		4½	4½	5½	5½	6½	6½	7½	8½	9½	10½	11½	13½	15½	17½	18½	20½
F Inside Diameter of Tongue,.....		3½	3½	4½	4½	5½	5½	6½	7½	8½	9½	10½	11½	13½	15½	17½	18½
G Outside Diameter of Groove,.....		4½	4½	5½	5½	6½	6½	7½	8½	9½	10½	11½	13½	15½	17½	18½	20½
H Inside Diameter of Groove,.....		3½	3½	4½	4½	5½	5½	6½	7½	8½	9½	10½	11½	13½	15½	17½	18½
I Depth of Groove,.....		¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾	¾
J Height of Tongue,.....		1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½	1½
L Diameter of Male Part,.....		3½	4½	5	5½	6	6½	7½	8½	9½	10½	11½	13½	15½	17½	18½	20½
M Diameter of Female Part,.....		3½	4½	5	5½	6	6½	7½	8½	9½	10½	11½	13½	15½	17½	18½	20½
N Diameter of Bolts,.....		3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½	3½
O Length of Bolts,.....		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
P Number of Bolts,.....		4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

The above dimensions refer to valves shown on pages 104 to 111.

All genuine valves have the name LUNKENHEIMER cast on body.

LUNKENHEIMER
ENGINE THROTTLE VALVE.
 Screw, Flange, or Screw Ends.
 Medium Pattern for 125 Pounds Working Pressure.
 Iron Body, Brass Mounted.



LEADING DIMENSIONS.

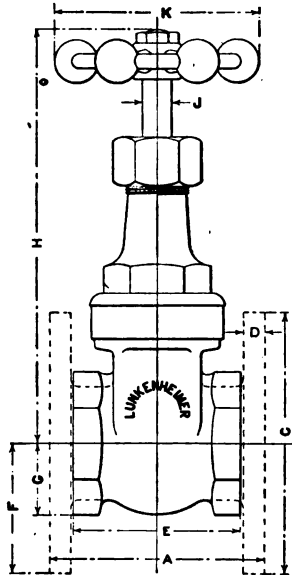
Size of Valve,.....inches	2	2½	3	3½	4	4½	5	6	7	8	9	10	12
A Face to Face Flange Ends,.....inches	4	4½	5	6	6½	6¾	7	8½	8¾	8¾	9	9¾	10¾
C Diameter of Flanges, inches	6	7	7½	8½	9	9¾	10	11	12½	13½	15	16	19
D Thickness of Flanges, inches	5½	4½	3½	1½	1½	1½	1½	1	1½	1½	1½	1½	1½
E Face to Face Screw Ends,.....inches	3½	4½	4½	5½	5½	6	6¾	7	7¼	7¾	7¾	8½	9¾
F Width of Hub,.....inches	5½	6¾	7½	8	9¼	10	11	12½	13½	15½	16½	17½	20½
G Diameter of Stem,.....inches	3½	4½	5	5½	6	6¾	7	8	9	10	11	12	15
H Center of Port to Top of Stem—When Open,.....inches	11½	14½	17½	19½	21½	22½	24½	27½	31½	33½	36½	39½	46½
Center of Port to Top of Stem—When Closed, inches	9½	11½	14½	15½	17	17½	19½	22	24½	26½	27½	29½	34
J Center of Port to Bottom of Flange,.....inches	3	3½	3½	4½	4½	4½	5	5½	6½	6½	7½	8	9½
K Center of Port to Bottom of Screw End Body,.....inches	2½	2½	2½	3½	3½	4½	4½	5½	5½	6½	7½	7½	9½
L Diameter of Hand Wheel,.....inches	5½	6	7	8	9	9	10	12	12	14	14	16	18

*The above dimensions refer to valves shown on pages 118 and 119.
 All genuine valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER
DOUBLE DISC GATE VALVES.

Medium Pattern. For 150 Pounds Working Pressure.

BRASS.



LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	3
A Face to Face Flange Ends,.....inches	2 $\frac{3}{4}$	3	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{4}$	4 $\frac{3}{4}$	5 $\frac{1}{4}$	6 $\frac{1}{4}$
C Diameter of Flanges,.....inches	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5	6	7
D Thickness of Flanges,.....inches	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$
E Face to Face Screw Ends,.....inches	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2 $\frac{1}{4}$	2 $\frac{3}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{4}$
F Center of Port to Bottom of Flanges,.....inches	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3	3 $\frac{3}{4}$
G Center of Port to Bottom of Screw End Body,.....inches	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$	1	1 $\frac{1}{4}$	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2 $\frac{1}{4}$
H Center of Port to Top of Stem—When Open,.....inches	4 $\frac{1}{2}$	4 $\frac{3}{4}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	9 $\frac{1}{2}$	11 $\frac{1}{2}$
I Center of Port to Top of Stem—When Closed,.....inches	3 $\frac{1}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{4}$	5 $\frac{1}{4}$	5 $\frac{1}{2}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	9 $\frac{1}{4}$
J Diameter of Stem,.....inches	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$
K Diameter of Handwheel,.....inches	1 $\frac{1}{2}$	1 $\frac{3}{4}$	2	2 $\frac{1}{4}$	2 $\frac{1}{2}$	3 $\frac{1}{4}$	3 $\frac{1}{2}$	4 $\frac{1}{4}$

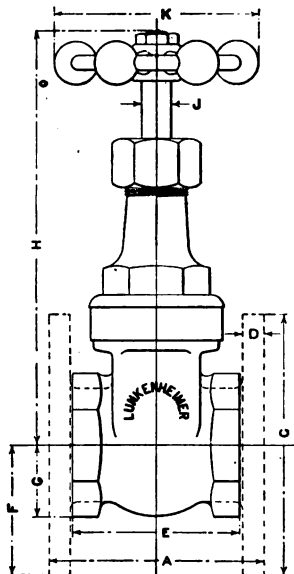
The above dimensions refer to valves shown on page 122.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

DOUBLE DISC GATE VALVES.

Extra Heavy Pattern. For 300 lbs. Working Pressure.

BRASS.



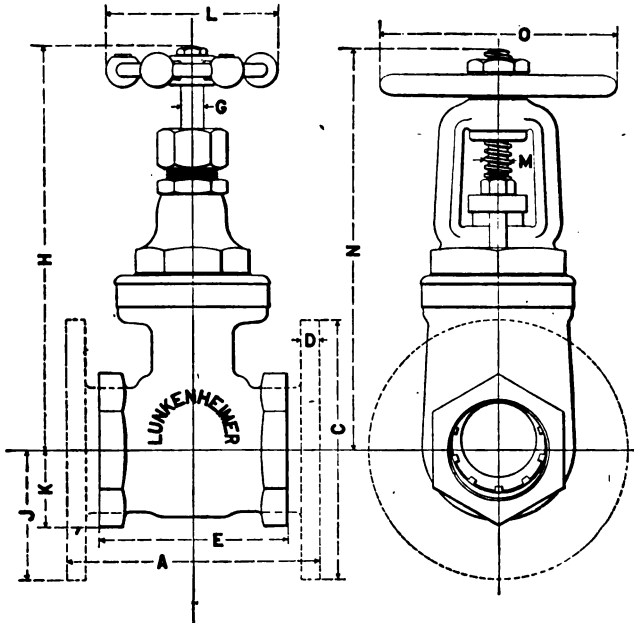
LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
A Face to Face Flange Ends,.....inches	2 $\frac{3}{4}$	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	6	7	7 $\frac{3}{4}$	
C Diameter of Flanges,.....inches	2 $\frac{1}{2}$	3	3 $\frac{3}{4}$	4	4 $\frac{1}{2}$	5	6	7	7 $\frac{3}{4}$	
D Thickness of Flanges,.....inches	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$
E Face to Face Screw Ends,.....inches	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2 $\frac{3}{8}$	2 $\frac{3}{8}$	2 $\frac{1}{2}$	3 $\frac{1}{4}$	4 $\frac{1}{4}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$
F Center of Port to Bottom of Flange,.....inches	1 $\frac{1}{2}$	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
G Center of Port to Bottom of Screw End Body,.....inches	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{1}{2}$	5 $\frac{1}{2}$	
H Center of Port to Top of Stem—When Open,.....inches	4 $\frac{1}{2}$	4 $\frac{1}{2}$	4 $\frac{1}{2}$	6 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	10 $\frac{1}{2}$	12	14 $\frac{1}{2}$	16 $\frac{1}{2}$
H Center of Port to Top of Stem—When Closed,.....inches	3 $\frac{3}{4}$	3 $\frac{3}{4}$	4 $\frac{1}{2}$	5 $\frac{3}{4}$	6 $\frac{3}{4}$	7 $\frac{3}{4}$	8 $\frac{3}{4}$	9 $\frac{3}{4}$	11 $\frac{3}{4}$	13 $\frac{3}{4}$
J Diameter of Stem,.....inches	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
K Diameter of Hand-wheel,.....inches	1 $\frac{1}{2}$	1 $\frac{1}{2}$	2	2 $\frac{1}{2}$	2 $\frac{1}{2}$	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$	5 $\frac{1}{2}$

The above dimensions refer to valves shown on page 123.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
WEDGE DISC GATE VALVES.
Stationary Stem and Rising Stem with Yoke.
Medium Pattern for 150 Pounds Working Pressure.
BRASS.



LEADING DIMENSIONS.

Size of Valve,	inches	3/4	1	1 1/4	1 1/2	2	2 1/2	3
A Face to Face Flange Ends,	inches	2 3/4	3 1/8	3 3/4	4 1/8	4 3/4	5 1/8	6 3/4
C Diameter of Flanges,	inches	2 1/8	3	3 1/4	4	4 1/4	5	6
D Thickness of Flanges,	inches	1/4	5/16	3/8	1/2	5/8	3/4	7/8
E Face to Face Screw Ends,	inches	2 7/8	2 1/4	2 3/4	3 1/8	3 3/4	4 1/8	5 1/4
G Diameter of Stationary Stem,	inches	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4
H Center of Port to Top of Stationary Stem Valve,	inches	4 3/8	4 3/4	5 1/8	5 3/4	6 1/8	6 3/4	7 1/8
J Center of Port to Bottom of Flange,	inches	1 1/4	1 1/8	1 1/2	1 3/4	2	2 1/4	2 3/4
K Center of Port to Bottom of Screw End Body,	inches	1 1/8	1 1/4	1 1/2	1 3/4	2	2 1/4	2 3/4
L Diameter of Stationary Stem Valve Hand Wheel,	inches	2	2	2 1/8	2 1/4	2 3/4	3 1/8	3 3/4
M Diameter of O S & Y Valve Stem,	inches	3/8	1/2	5/8	3/4	7/8	1	1 1/8
N Center of Port to Top of O S & Y Stem When Open,	inches	4 1/8	4 3/4	5 1/8	5 3/4	6 1/8	6 3/4	7 1/8
O Center of Port to Top of O S & Y Stem When Closed,	inches	4 1/4	5 1/8	6 1/4	7 1/8	8 1/4	9 1/8	10 1/4
D Diameter of O S & Y Valve Hand Wheel,	inches	3	3 1/4	4	4 1/4	5	5 1/4	6

The above dimensions refer to pages 124 to 127.

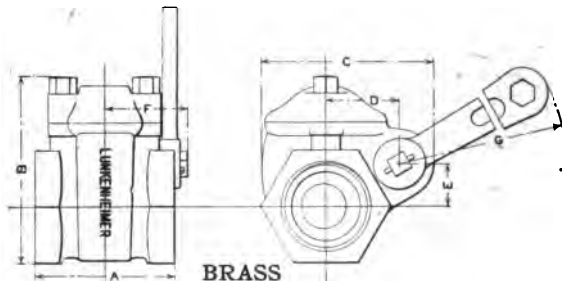
All genuine valves have the name LUNKENHEIMER cast on body.

THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

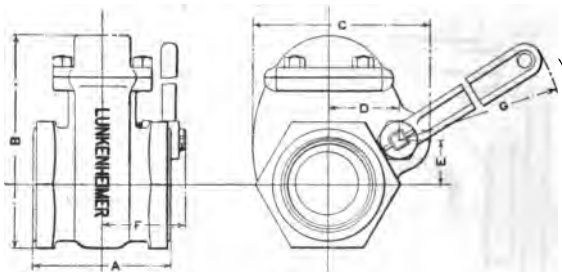
LUNKENHEIMER "HANDY" QUICK OPENING GATE VALVES.

For 75 Pounds Working Pressure.

Brass, Iron Body Brass Mounted or All Iron.



BRASS



Iron Body Brass Mounted.

BRASS HANDY VALVES.

LEADING DIMENSIONS.

Size of Valve,	inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
A Face to Face,	inches	2	$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{1}{2}$	$2\frac{3}{4}$	3	$3\frac{3}{8}$	$3\frac{3}{4}$
B Height of Valve,	inches	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$4\frac{3}{8}$	$5\frac{1}{8}$
C Width of Valve Body,	inches	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{1}{8}$
D Vertical Center to Center of Stem,	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$
E Center of Port to Center of Stem,	inches	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$
F Center to End of Stem,	inches	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{3}{8}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{3}{8}$
G Radius of Lever Circle,	inches	$3\frac{1}{8}$	$3\frac{1}{4}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$8\frac{1}{8}$	10

I. B. B. M. or All Iron Handy Valves.

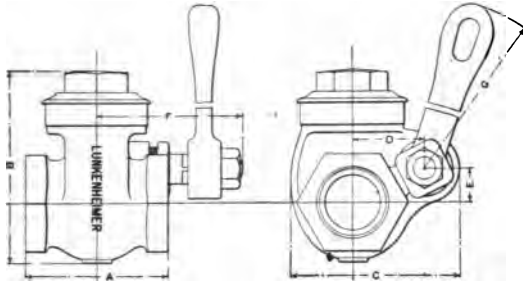
Size of Valve,	in.	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	8
A Face to Face,	in.	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{2}$	5	$6\frac{1}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$7\frac{1}{8}$	$8\frac{1}{8}$	$9\frac{1}{8}$
B Height of Valve,	in.	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{2}$	5	$6\frac{1}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$7\frac{1}{8}$	$8\frac{1}{8}$	$9\frac{1}{8}$
C Width of Valve Body,	in.	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{2}$	5	$6\frac{1}{8}$	$6\frac{1}{4}$	$6\frac{3}{4}$	$7\frac{1}{8}$	$8\frac{1}{8}$	$9\frac{1}{8}$
D Vertical Center to Center of Stem,	in.	1	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$2\frac{3}{4}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$5\frac{1}{4}$
E Center of Port to Center of Stem,	in.	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
F Center to End of Stem,	in.	$1\frac{1}{4}$	$1\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{4}$	$2\frac{1}{2}$	$3\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{1}{2}$	$5\frac{1}{4}$
G Radius of Lever Circle,	in.	$4\frac{1}{8}$	$5\frac{1}{4}$	$5\frac{1}{2}$	$6\frac{1}{4}$	$7\frac{1}{4}$	$8\frac{1}{4}$	10	$12\frac{1}{4}$	$15\frac{1}{4}$	$19\frac{1}{4}$	$22\frac{1}{4}$	$27\frac{1}{4}$	$34\frac{1}{4}$

The above dimensions refer to valves shown on pages 128 and 129.

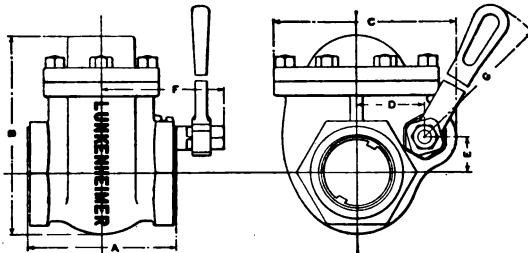
All genuine valves have the name LUNKENHEIMER cast on the body.

**LUNKENHEIMER
LEVER THROTTLE QUICK OPENING GATE
VALVES.**

**Brass. For 175 Pounds Working Pressure.
Iron Body Brass Mounted and All Iron. For 150 Pounds Working
Pressure.**



BRASS.



**Iron Body Brass Mounted or All Iron.
LEADING DIMENSIONS. BRASS LEVER THROTTLE VALVES.**

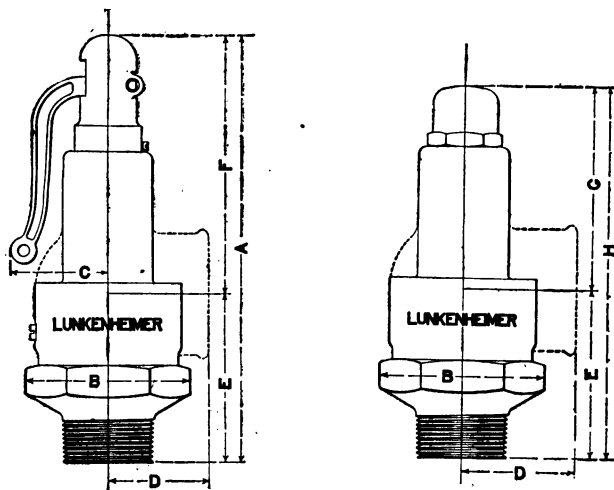
Size of Valve,.....inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
A Face to Face, .....inches	$2\frac{1}{8}$	3	$3\frac{3}{8}$	$3\frac{7}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$
B Height of Valve, .....inches	$3\frac{1}{8}$	4	$4\frac{1}{8}$	5	6	7
C Width of Valve Body, .....inches	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{7}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$
D Vertical Center to Center of Stem, .....inches	$1\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{3}{8}$	$1\frac{3}{4}$	$2\frac{1}{8}$	$2\frac{3}{8}$
E Center of Port to Center of Stem, .....inches	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{3}{8}$	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{3}{8}$
F Center to End of Stem, .....inches	$2\frac{1}{8}$	$3\frac{1}{4}$	$3\frac{3}{8}$	$3\frac{7}{8}$	$4\frac{1}{8}$	$4\frac{3}{8}$
G Radius of Lever Circle, .....inches	$5\frac{1}{8}$	$7\frac{3}{4}$	$8\frac{1}{8}$	$9\frac{1}{8}$	$10\frac{1}{8}$	$13\frac{1}{8}$

I. B. B. M. OR ALL IRON LEVER THROTTLE VALVES.

Size of Valve,.....inches	2	$2\frac{1}{2}$	3	$3\frac{1}{2}$	4	5	6
A Face to Face, .....inches	$5\frac{1}{2}$	$6\frac{3}{8}$	$6\frac{1}{4}$	$7\frac{1}{8}$	$7\frac{3}{8}$	$8\frac{1}{4}$	$9\frac{1}{4}$
B Height of Valve, .....inches	$6\frac{3}{8}$	$7\frac{3}{8}$	$9\frac{3}{8}$	$10\frac{3}{8}$	$11\frac{3}{8}$	$12\frac{1}{4}$	$15\frac{3}{8}$
C Width of Valve Body, .....inches	$6\frac{3}{8}$	$7\frac{3}{8}$	$8\frac{3}{8}$	$9\frac{3}{8}$	10	$11\frac{3}{8}$	$12\frac{1}{4}$
D Vertical Center to Center of Stem, .....inches	$2\frac{1}{4}$	$2\frac{1}{2}$	3	$3\frac{3}{8}$	$3\frac{3}{4}$	$4\frac{1}{2}$	$4\frac{3}{4}$
E Center of Port to Center of Stem, .....inches	$1\frac{3}{4}$	$1\frac{7}{8}$	$1\frac{1}{2}$	2	$2\frac{1}{8}$	$2\frac{1}{4}$	$3\frac{1}{4}$
F Center to End of Stem, .....inches	$4\frac{3}{4}$	$5\frac{1}{8}$	$5\frac{1}{2}$	$5\frac{3}{8}$	$5\frac{7}{8}$	$6\frac{3}{4}$	$7\frac{3}{8}$
G Radius of Lever Circle, .....inches	$10\frac{1}{4}$	$13\frac{3}{4}$	$15\frac{3}{8}$	18	18	23	23

The above dimensions refer to valves shown on pages 130 and 131.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER
POP SAFETY AND RELIEF VALVES.
BRASS



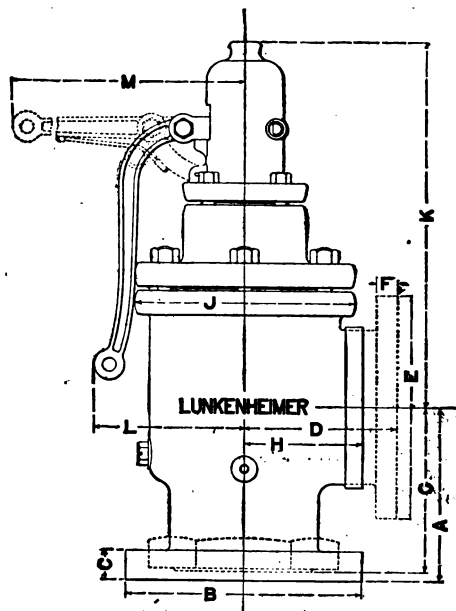
LEADING DIMENSIONS.

Size of Valves,.....inches	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3
A Height of Pop Valves over all, inches	$5\frac{7}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$8\frac{3}{8}$	$9\frac{3}{8}$	$11\frac{1}{8}$	$13\frac{3}{8}$	$15\frac{1}{4}$
B Extreme Diameter,.....inches	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$4\frac{3}{8}$	$5\frac{3}{8}$	6
C Center to Outside Edge of Pop Valve Lever,.....inches	$1\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
D Center to Face of Angle Outlet Pop and Relief Valves,.....inches	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{3}{8}$	2	$2\frac{1}{4}$	$2\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
E Face of Inlet to Center of Angle Outlet, Pop and Relief Valves,.....inches	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$5\frac{3}{8}$	$6\frac{1}{8}$
F Center of Angle Outlet to Top of Pop Valve,.....inches	$3\frac{1}{8}$	$4\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{3}{8}$	6	$6\frac{1}{8}$	8	$9\frac{1}{8}$
G Center of Angle Outlet to Top of Relief Valve,.....inches	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$4\frac{3}{8}$	$5\frac{1}{8}$	$6\frac{3}{8}$	$7\frac{1}{8}$
H Height of Relief Valve over all, inches	5	$5\frac{1}{2}$	6	$7\frac{1}{4}$	8	9	$11\frac{1}{4}$	$13\frac{1}{4}$

*The above dimensions refer to valves shown on pages 160, 161, 172 and 173.
All genuine valves have the name LUNKENHEIMER cast on body.*

LUNKENHEIMER POP SAFETY VALVES.

Iron Body Brass Mounted. For Marine or Stationary Boilers.
Screw or Flange Ends. Improved and Plain Patterns.



LEADING DIMENSIONS.

Size of Valve,.....	inches	2	2½	3	3½	4	4½	5	6
A Center to Face of Inlet, Flange End,	inches	4½	5	5½	6½	7½	7¾	8½	10½
B Diameter of Inlet Flange,.....	inches	6½	7½	8½	9	10	10½	11	12½
C Thickness of Inlet Flange,	inches	¾	1	1½	1¾	1¾	1¾	1¾	1¾
D Center to Face of Outlet Flange End,.....	inches	4½	4¾	5½	6	6½	6¾	7¾	8½
E Diameter of Outlet Flange,.....	inches	7	7½	8½	9	9½	10	11	12½
F Thickness of Outlet Flange,	inches	¾	¾	1	1½	1½	1½	1	1½
G Center to Face of Inlet Screw End,.....	inches	4½	4½	5½	6½	7½	7¾	8½	10½
H Center to Face of Outlet Screw End,.....	inches	3	3½	3¾	4½	4¾	5½	5½	6¾
J Diameter of Body and Cap Flanges,	inches	5½	6½	7	7½	9	9¾	10½	12
K Center of Outlet to Top of Valve,	inches	9	10½	11½	13½	14½	16½	17½	19½
L Center to Outside Edge of Curved Lever,.....	inches	4½	4½	4½	5½	6½	6½	7½	8½
M Center to End of Horizontal Lever,.....	inches	7½	8½	9½	10½	11½	12½	14½	16½

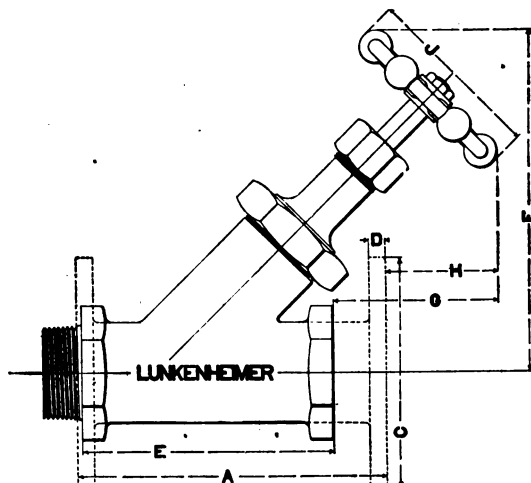
The above dimensions refer to valves shown on pages 162 to 165.
All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER REGROUNDING STRAIGHTWAY BLOW-OFF VALVES.

Medium Pattern

For 200 Pounds Working Pressure.

BRASS.



LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
A Face to Face Flange Ends,.....inches	$4\frac{1}{2}$	$4\frac{7}{8}$	$5\frac{3}{4}$	$6\frac{1}{8}$	$7\frac{1}{8}$	$9\frac{1}{4}$
C Diameter of Flanges,.....inches	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7
D Thickness of Flanges,.....inches	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
E Face to Face Screw Ends,.....inches	$3\frac{1}{2}$	$3\frac{3}{4}$	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$7\frac{3}{4}$
F Center to Top of Hand Wheel, When Open, inches	$5\frac{1}{2}$	$6\frac{1}{2}$	$7\frac{1}{8}$	$8\frac{1}{4}$	$10\frac{1}{4}$	$12\frac{3}{4}$
Center to Top of Hand Wheel, When Closed, inches	$5\frac{1}{2}$	6	$6\frac{1}{4}$	$6\frac{3}{4}$	9	$10\frac{3}{4}$
Hexagon to End of Hand Wheel, When Opened, inches	$3\frac{1}{4}$	$4\frac{1}{4}$	$4\frac{1}{4}$	5	$6\frac{1}{4}$	$6\frac{3}{4}$
G Hexagon to End of Hand Wheel, When Closed, inches	$2\frac{7}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$	$3\frac{1}{2}$	$4\frac{1}{2}$	$4\frac{3}{4}$
H Flange to End of Hand Wheel, When Open, inches	$2\frac{3}{4}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{1}{2}$	5	$5\frac{1}{2}$
Flange to End of Hand Wheel, When Closed, inches	$1\frac{1}{2}$	$2\frac{1}{8}$	$2\frac{1}{2}$	$2\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{3}{4}$
J Diameter of Hand Wheel, .....inches	$2\frac{1}{2}$	$3\frac{1}{2}$	$3\frac{1}{2}$	4	$4\frac{1}{2}$	$5\frac{1}{2}$

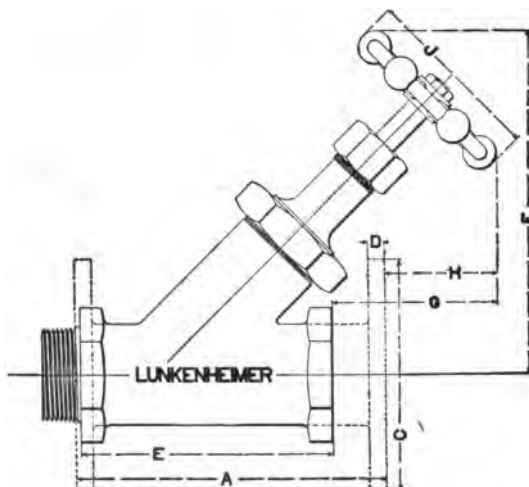
The above dimensions refer to valves shown on page 184.

All genuine valves have the name LUNKENHEIMER cast in valve shell and wheel has letters "S" on same.

LUNKENHEIMER **REGRINDING STRAIGHTWAY BLOW-OFF VALVES.**

Extra Heavy Pattern.
For 300 Pounds Working Pressure.

BRASS



LEADING DIMENSIONS.

Size of Valve,.....inches	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$
A Face to Face Flange Ends,.....inches	$4\frac{1}{8}$	$5\frac{1}{8}$	$6\frac{1}{8}$	$6\frac{1}{8}$	$8\frac{3}{8}$	10
C Diameter of Flange,.....inches	$3\frac{1}{2}$	4	$4\frac{1}{2}$	5	6	7
D Thickness of Flanges,.....inches	$\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{1}{2}$
E Face to Face Screw Ends,.....inches	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{3}{4}$	$5\frac{1}{4}$	$6\frac{1}{8}$	$8\frac{3}{4}$
Center to Top of Handwheel—When Open,.....inches	$6\frac{1}{8}$	$7\frac{1}{8}$	$8\frac{1}{4}$	$9\frac{1}{4}$	$11\frac{1}{8}$	$13\frac{1}{4}$
F Center to Top of Handwheel—When Closed, inches	$5\frac{3}{8}$	$6\frac{1}{8}$	$7\frac{1}{8}$	8	$9\frac{3}{8}$	11
Hexagon to End of Handwheel—When Open, inches	$3\frac{3}{4}$	$4\frac{1}{4}$	$4\frac{3}{4}$	$5\frac{1}{4}$	$6\frac{1}{8}$	$7\frac{3}{4}$
G Hexagon to End of Handwheel—When Closed, inches	$2\frac{3}{4}$	$3\frac{1}{4}$	$3\frac{3}{4}$	4	$4\frac{3}{8}$	$5\frac{1}{4}$
Flange to End of Handwheel—When Open,.....inches	$2\frac{3}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$4\frac{1}{8}$	$4\frac{1}{8}$	$5\frac{1}{8}$
H Flange to End of Handwheel—When Closed, inches	$1\frac{3}{8}$	$2\frac{1}{8}$	$2\frac{3}{8}$	$2\frac{3}{8}$	$3\frac{1}{4}$	$3\frac{3}{8}$
J Diameter of Handwheel,.....inches	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	4	$4\frac{3}{4}$	$5\frac{1}{2}$

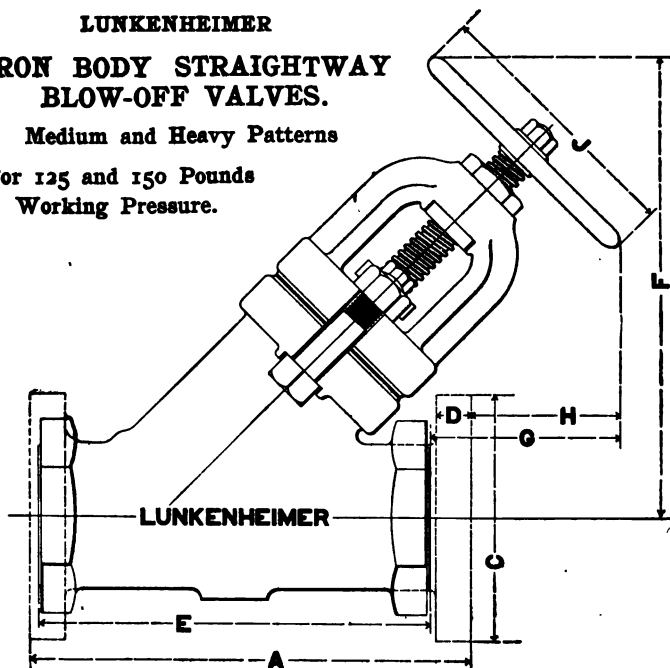
The above dimensions refer to valves shown on page 185.

All genuine valves have the name LUNKENHEIMER cast in the valve shell and wheel has letters S on same.

LUNKENHEIMER **IRON BODY STRAIGHTWAY** **BLOW-OFF VALVES.**

Medium and Heavy Patterns

For 125 and 150 Pounds
Working Pressure.



LEADING DIMENSIONS.

Size of Valve,.....	inches	2	2½	3
A Face to Face, Flange Ends,	{ Standard Dimension,	9½	10½	12½
	{ Heavy Dimension,	10	11½	13½
C Diameter of Flanges,	{ Standard Dimension,	6	7	7½
	{ Heavy Dimension,	6½	7½	8½
D Thickness of Flanges,	{ Standard Dimension,	¾	1½	¾
	{ Heavy Dimension,	¾	1	1½
E Face to Face, Screw Ends,	inches	8½	10½	11½
F Center to Top of Hand Wheel,...	{ Open, ..	11½	14	16½
	{ Closed,	10½	12½	13½
G Hexagon to End of Hand Wheel,...	{ Open, ..	5½	6½	7½
	{ Closed,	4½	4½	5½
H Flange to End of Hand Wheel,...	{ Standard Dimension, {	{ Open, .. inches	4½	5½
		{ Closed, .. inches	3½	4½
	{ Heavy Dimension, ...	{ Open, .. inches	4½	5½
		{ Closed, .. inches	2½	3½
J Diameter of Hand Wheel,	inches	5½	6	7

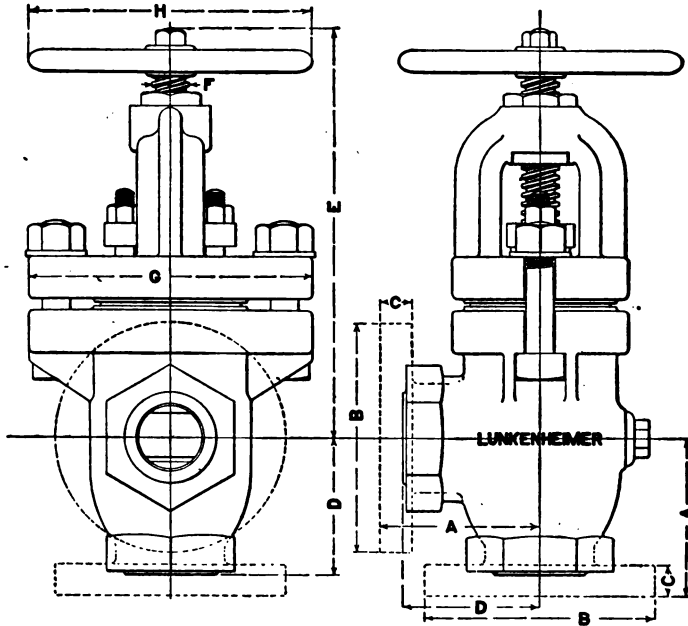
The above dimensions refer to valves shown on page 186.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

“DURO” BLOW-OFF VALVE.

Iron Body Brass Mounted.



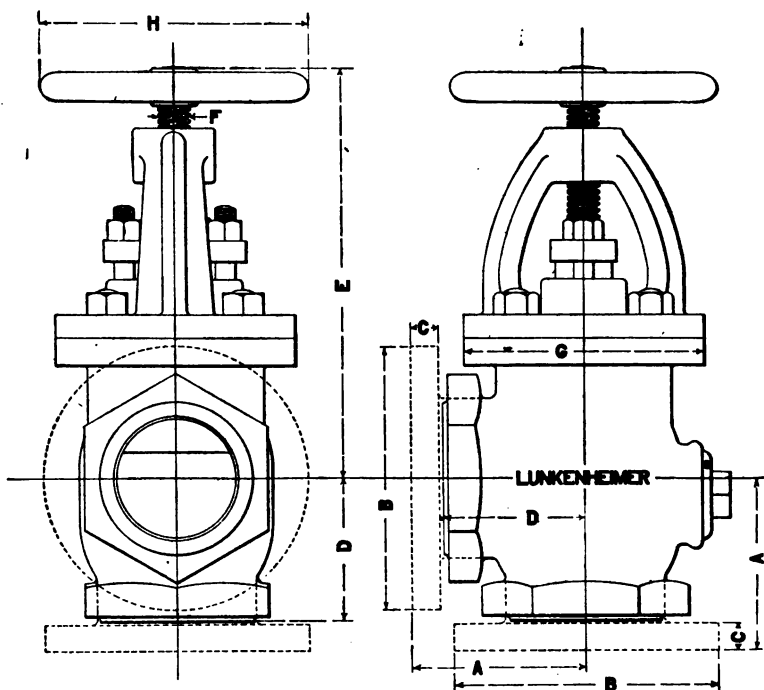
LEADING DIMENSIONS.

Size of Valve.....inches	1½	1½	2	2½	3
A Center to Face of Inlet or Outlet Flange Ends.....inches	4	4½	4¾	5¼	5¾
B Diameter of Flanges.....inches	5	6	6½	7½	8½
C Thickness of Flanges.....inches	1½	¾	1	1½	1¾
D Center to Face of Inlet or Outlet Screw Ends.....inches	3¾	3¾	4¾	4¾	5¾
E Center of Port to Top of Stem—When Open.....inches	12¼	13¾	15¾	16¾	18¾
F Center of Port to Top of Stem—When Closed.....inches	10½	11¾	12¾	14	15½
F Diameter of Stem.....inches	¾	¾	1	1¾	1¾
G Length of Body and Yoke Flanges.....inches	6½	7¼	7¾	9½	10½
H Diameter of Handwheel.....inches	6	7	8	9	10

*The above dimensions refer to valves shown on pages 187 to 189.
All genuine valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER
ANGLE BLOW-OFF VALVE.

Iron Body Brass Mounted.

**LEADING DIMENSIONS.**

Size of Valve,.....inches	1½	2	2½	3
A Center to Face of Inlet or Outlet Flange Ends,.....inches	3½	3¾	4¾	4¾
B Diameter of Flanges,.....inches	5	6	7	7½
C Thickness of Flanges,.....inch	¾	¾	1½	¾
D Center to Face of Inlet or Outlet Screw Ends,.....inches	2½	2¾	3¾	4
Center of Port to Top of Stem When Open,.....inches	9¾	10¾	12¾	14¾
E Center of Port to Top of Stem When Closed,.....inches	8	8¾	10¾	12
F Diameter of Stem,.....inch	1½	¾	¾	¾
G Diameter of Body and Yoke Flanges,.....inches	4¾	5	6½	6¾
H Diameter of Hand Wheel,.....inches	4	5½	6	7

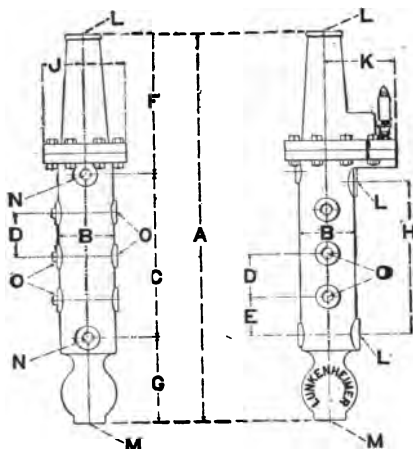
The above dimensions refer to valves shown on pages 190 and 191.

All genuine valves have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER

"VIGILANT" SAFETY WATER COLUMNS.

Iron Body Brass Mounted.



LEADING DIMENSIONS.

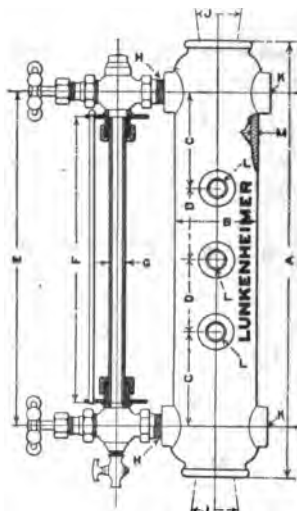
Size,	number	4	5	6	7	8
A Length over all,	inches	30 $\frac{1}{8}$	35 $\frac{5}{8}$	35 $\frac{5}{8}$	40 $\frac{1}{2}$	51 $\frac{1}{2}$
B Diameter of Body,	inches	5	5	5	5 $\frac{5}{8}$	5 $\frac{5}{8}$
C Center to Center of Water Gauge Connections,	inches	12	15	15	18	24
D Center to Center of Gauge Cocks,	inches	3	4	4	5	7 $\frac{1}{2}$
E From Center of Lower Gauge Cock to Center of Water Connection,	inches	3	3 $\frac{1}{2}$	3 $\frac{1}{2}$	4	4 $\frac{1}{2}$
F Top of Column to Center of Upper Water Gauge Connection,	inches	10 $\frac{1}{2}$	12 $\frac{1}{2}$	12 $\frac{1}{2}$	14 $\frac{1}{2}$	18 $\frac{1}{2}$
G Center of Lower Water Gauge Connection to Bottom of Column,	inches	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{2}$	8 $\frac{1}{2}$
H Center to Center of Water and Steam Connections on Babcock & Wilcox type of boilers,	inches	.....	.....	14	.....	.....
J Width of Body and Cap Flanges,	inches	7 $\frac{1}{2}$	7 $\frac{1}{2}$	7 $\frac{1}{2}$	8 $\frac{1}{4}$	8 $\frac{1}{4}$
K From Center of Body to Rear End of Body and Cap Flanges,	inches	6 $\frac{1}{4}$	6 $\frac{1}{4}$	6 $\frac{1}{4}$	6 $\frac{5}{8}$	6 $\frac{5}{8}$
L Pipe Tap for Steam and Water Connections,	inches	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$
M Pipe Tap for Drain Connection,	inches	1	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{4}$	1 $\frac{1}{2}$
N Pipe Tap for Water Gauge Connections,	inch	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$
O Pipe Tap for Gauge Cocks,	inch	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$	$\frac{3}{4}$

The above dimensions refer to valves shown on pages 194 to 197.

All genuine columns have the name LUNKENHEIMER cast on the body.

LUNKENHEIMER WATER COLUMNS.

Iron Body Brass Mounted.



LEADING DIMENSIONS.

Size.....	number	1	2	3
A Length of Column.....	inches	14 $\frac{3}{4}$	16 $\frac{3}{4}$	18 $\frac{1}{2}$
B Diameter of Column.....	inches	2 $\frac{1}{4}$	2 $\frac{3}{4}$	3 $\frac{1}{2}$
C Center of Water Gauge to Gauge Cock.....	inches	2 $\frac{3}{4}$	3	3 $\frac{3}{4}$
D Center to Center of Gauge Cocks.....	inches	2 $\frac{3}{4}$	3 $\frac{1}{4}$	3 $\frac{3}{4}$
E Center to Center of Water Gauge.....	inches	11	12 $\frac{1}{2}$	14
F Length of Glass.....	inches	10	10 $\frac{1}{2}$	12
G Diameter of Glass.....	inch	$\frac{5}{8}$	$\frac{5}{8}$	$\frac{3}{4}$
H Size of Water Gauge Connections.....	inch	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
J Size of End Connections.....	inch	$\frac{1}{4}$	$\frac{1}{4}$	1
K Size of Rear Connections.....	inch	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{3}{4}$
L Size of Gauge Cock Connections.....	inch	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{1}{2}$
M Thickness of Metal.....	inch	$\frac{1}{16}$	$\frac{1}{16}$	$\frac{1}{16}$

For size of boiler connections on Nos. 1 and 2 columns refer to letter K.

For size of boiler connections on No. 3 column refer to letter J.

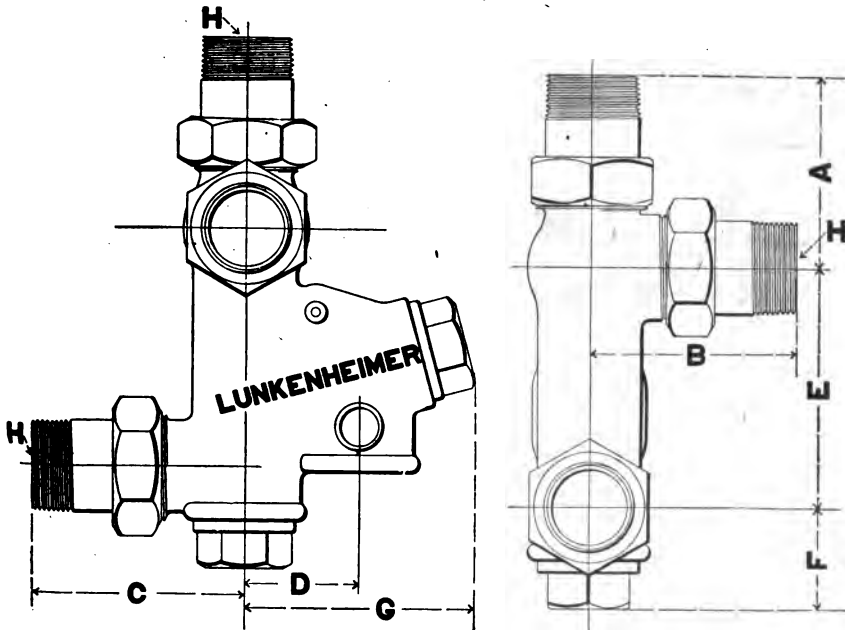
The above dimensions refer to lists on page 198.

These columns can also be made entirely of gun metal. Prices on application.

**LUNKENHEIMER
AUTOMATIC INJECTOR.**

**For Boilers of Stationary, Portable or Traction Engines,
Steamboats, Etc.**

BRASS.

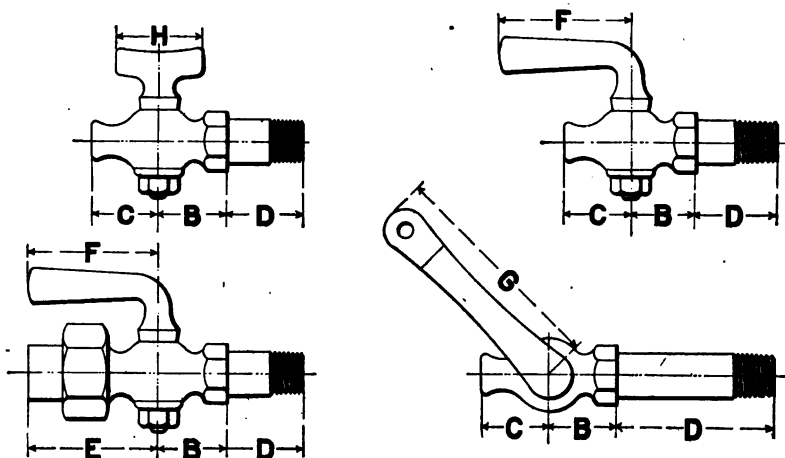


LEADING DIMENSIONS.

Size,.....	number	1, 1½	2, 2½	3, 3½	4, 4½	5, 6	7, 8	9, 10
A Center of Suction to End of Steam Connection,.....inches	2	2½	2¾	3½	3½	4½	5½	
B Center of Body to End of Suction,.....inches	2½	2¾	2¾	3½	3½	4½	5½	
C Center of Body to End of Delivery Connection, inches	2½	2¾	2¾	3½	3½	4½	5½	
D Center of Body to Center of Overflow,.....inches	1½	1½	1½	1½	2½	2½	3½	
E Center of Delivery to Center of Suction,.....inches	1¾	2¼	2¾	3½	4½	5½	6½	
F Center of Delivery to Bot. of Delivery Pipe Cap, inches	¾	1½	1½	1½	1½	2½	3	
G Center of Body to Outside of Overflow Valve Cap, inches	2½	2½	2½	3½	4½	4½	6½	
H Size of Pipe Connections,.....inches	¾	½	¾	1	1½	1½	2	

*The above dimensions refer to Injectors shown on pages 264 to 269.
All genuine valves have the name LUNKENHEIMER cast on the body.*

LUNKENHEIMER
CYLINDER AND TRACTION COCKS.
BRASS.



LEADING DIMENSIONS.

Number,	1	2	3	4	6
Pipe Thread, .....Inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{3}{4}$
Size of Union, .....Inch	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{3}{8}$	$\frac{1}{2}$
B, .....Inches	$\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
C, .....Inches	$\frac{3}{4}$	$\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$
D, {	Short Shank—For Regular Cylinder Cocks and Short Shank Traction Cocks, .....Inches				
	$1\frac{1}{8}$	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$
D, {	Long Shank—For Regular Traction Cocks and Long Shank Cylinder Cocks, .....Inches				
	$1\frac{3}{4}$	$1\frac{3}{4}$	$2\frac{3}{4}$	$2\frac{1}{8}$	$3\frac{1}{2}$
E, .....Inches	$1\frac{1}{2}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$
F, .....Inches	$1\frac{3}{8}$	$1\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$	$2\frac{1}{8}$
G, .....Inches	$2\frac{1}{8}$	$2\frac{1}{8}$	$3\frac{1}{8}$	$3\frac{1}{8}$	$4\frac{1}{8}$
H, .....Inches	1	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$	$1\frac{1}{8}$

The above dimensions refer to cocks shown on page 237.

SECTION XV.

TABLES AND USEFUL DATA.

REMARKS ON ERECTING STEAM PIPING AND ATTACHING VALVES.

To convey steam from a boiler to the engine or other apparatus would at first seem a problem easy to solve, but in most cases it is usually found that the cause of bursting pipes and their fittings is due to the incorrect method of erecting the piping and not to any defect in the articles themselves. Pipes and their fittings, as a rule, will withstand a stress of from three to four times the pressure under which they are intended to work; nevertheless, constant annoyance, danger, and sometimes wholesale disaster, is caused by steam pipes and their fittings, solely because of false erections, and to any one or a combination of the following troubles can be attributed the break down:

WATER HAMMER,
EXPANSION OR DISTORTION,
WANT OF ALIGNMENT,
EXCESSIVE TEMPERATURE AND VIBRATION,
INTERNAL AND EXTERNAL CORROSION.

WATER HAMMER: The exact nature of the phenomenon known as "Water Hammer" has never been clearly defined, though its effects are only too well known to every engineer, the cause arising from an accumulation of condensed steam in the pipes or their fittings. Should steam be suddenly admitted to a pipe partly filled with cold water, the latter will be set in violent motion and travel the length of the pipe in the form of waves, with sufficient velocity to rupture any valve, blank flange, or other obstruction in its path. The extent of the rupture depends on the velocity of the incoming steam; for instance, if the valve controlling the entrance of the steam to a pipe partly filled with water is opened suddenly, a violent explosion will certainly follow, but if the valve is opened very gradually, while there may be a certain amount of noise and vibration, no serious results will occur.

EXPANSION: To expansion and contraction can be attributed most of the trouble arising from leaky joints. Too much stress cannot be laid on the importance of proper provision for expansion, nevertheless the same is overlooked.

Bends are now being frequently used, by which means all expansion strain can be taken up, and the number of joints is materially reduced. When used for purposes of taking up expansion, it is well to make them as light as is consistent with safety.

Remarks on Erecting Steam Piping and Attaching Valves.—
Continued.

WANT OF ALIGNMENT: Want of alignment sometimes causes trouble by throwing excessive strains on the flanges of stop valves, separators, etc. This is brought about, as a rule, by the flanges having been forced into contact with each other by means of the joining bolts instead of fitting into place as they should.

The flanges of modern steel pipes and valves are usually of ample thickness, and if they do not come together fairly in the first instant, they should be taken down and refaced and a thin ring of sheet steel put in to make up the length, if necessary.

When erecting heavy pipes, every length should be placed in position and properly supported and leveled by its own slings and brackets, when it will usually be found that several lengths have to be altered before the flange faces come into alignment, and not until this has been done and every pair of flanges inspected by some responsible person, should the various lengths be bolted together permanently.

VIBRATION: When a number of small or moderate sized engines are connected with the same pipe system and stand on the same foundation, or at least in the same building, it is sometimes difficult to prevent the pipes from vibrating and at the same time insure the necessary freedom for expansion and contraction. Matters should therefore be arranged in such a way, that, while the pipes are quite free to move in one direction, parallel with their length, movement in other directions should be restricted as far as possible.

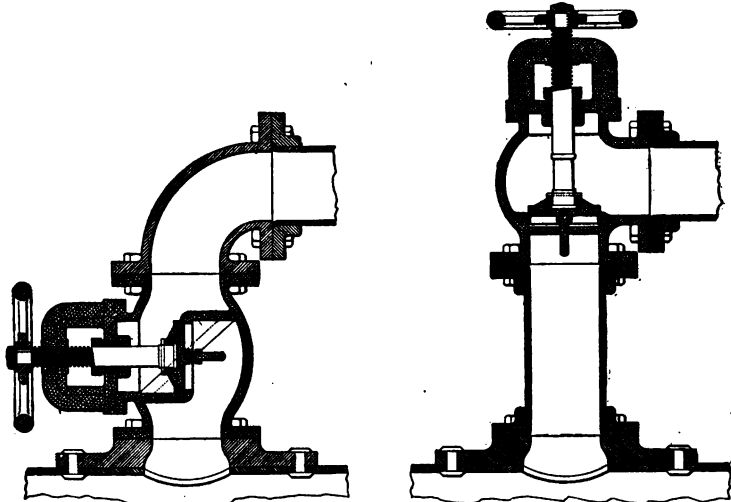
CORROSION: If the feed water contains lime salts, the latter will deposit in the economizer and feed connection and more or less effectually protect the pipes from internal corrosion, but if the water is very free from lime, and if at the same time air is introduced by the feed pump, internal pitting will be set up and probably do considerable damage before it is discovered and steps taken to prevent further mischief.

External corrosion does not, as a rule, give much trouble, but under certain conditions the combined action of heat and moisture on asbestos pipe covering will set up pitting. This, however, can be prevented by painting the pipes with any good graphite paint before the covering is applied.

Remarks on Erecting Steam Piping and Attaching Valves.

—Continued.

POSITION OF VALVES: In placing valves, the first and most important feature is to ascertain whether the valve will act as a water-trap for condensed steam. Cut 1 illustrates the common error in the placing of valves, as this arrangement permits of the accumulation of condensed steam above the valves when same are closed, and should the engineer be careless and open the valve suddenly, serious results would follow owing to water hammer. Cut 2 illus-



Cut 1.

Cut 2.

trates the correct method of placing the valve. It sometimes occurs, however, that it is not convenient to place the valve as shown in cut 2 and that cut 1 is the only manner in which the valve can be placed. In such an instance the valve should have a drain, and this drain should be opened at all times before the large valve is opened.

We could cite a number of instances regarding the wrong manner of placing valves, but if the party in charge of the erecting will always take into consideration the question of drainage and arrange the pipes and valves to overcome any trouble that may arise from this source, he shall have accomplished the most important part of his task.

METHOD OF PREVENTING VIBRATION AND SUPPORTING PIPES:

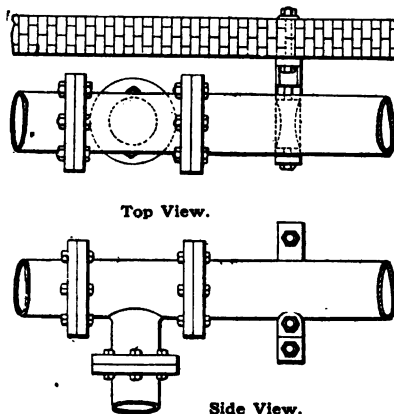
Fig. 3 shows a main header carried in suitable frames fitted with adjustable rollers and anchored to the wall of a building.

While we have illustrated the pipe as resting on the adjustable rollers, nevertheless the rollers may also be placed at the sides or on top of the pipe to prevent vibration, or in cases where the thrust from a horizontal or vertical branch has to be provided for.

Remarks on Erecting Steam Piping and Attaching Valves.

—Continued.

While this arrangement will take care of the vibration, it will not, however, in any way prevent the free expansion and contraction of the pipe.



Cut 3.

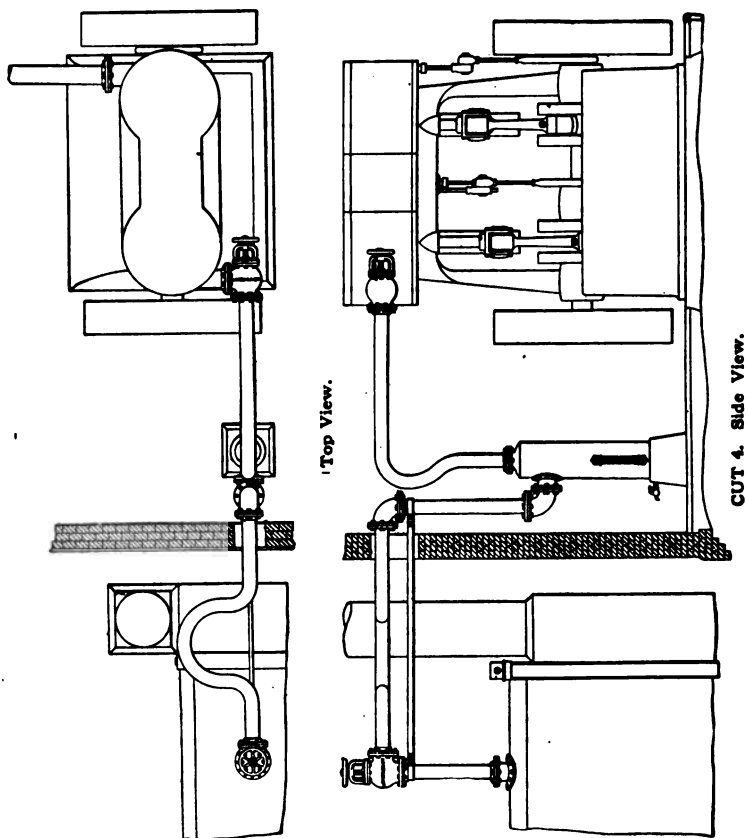
CORRECT METHOD OF PIPING: Cut 4 shows a simple arrangement, in which the valves have been properly placed and the pipe arranged with due regard to drainage and expansion.

It will be noticed that should the boiler valve leak slightly, any steam which may condense in the pipes will at once be carried to the separator, and any strain due to the vibrating action which is set up in pipes having expansion bends, by the thrust of the steam pulsation, is taken care of by the tie rod. This rod also makes it possible to carry the vertical pipes on the boiler and separator up to any reasonable height without risk of straining the joints, by absorbing the thrust of the expansion bend acting on the unsupported ends of the vertical pipes.

REMARKS ON ATTACHING VALVES: Too much stress cannot be laid upon the subject of properly attaching valves, and while it is far from our intention to cast aspersions upon the ability of the vast number of steam fitters, engineers and others who are constantly engaged in construction work, yet we think a few remarks regarding this important matter will not be out of order.

The classes of valves to which we have reference in particular are the Brass Body ones. It is well known that brass is a much softer metal than iron, and in screwing an iron pipe into a brass valve body it is hardly necessary to use any lead or pipe joint grease at all, as the brass will give sufficiently to form a tight joint. When lead or pipe joint grease is used, we would recommend that it be put on the pipe end and not in the valve, as when the steam is turned on, this stuff is carried to the bearing parts of the valve, and owing to its sticky

Remarks on Erecting Steam Piping and Attaching Valves.
—Continued.



Remarks on Erecting Steam Piping and Attaching Valves.— Continued.

nature, catches and holds grit and scale on the seats and discs of said valve to its great detriment.

We would also call attention to a bad practice that is sometimes followed in screwing pipe and brass valves together; i. e., using extra long pipe tongs or wrenches and placing same on the hexagon farthest from the pipe end which is being connected, as when this is done, no matter how heavy the valve body may be, it will tend to spring the seat and place same out of line. In screwing pipe into gate and other styles of valves, always close same tight so as to make same as rigid as possible.

Piping should be cleaned out before screwing together, and if possible the line should be blown out after the valves are in place. Unless this is done, loose scale or metal chips remaining in the pipes may injure the seats or discs and cause leaks, require regrinding, reseating, or renewal of discs.

A valve should not be allowed to carry the weight of a line of piping, as this may spring the seat. A hanger properly placed has sometimes remedied the trouble with a leaky valve which could not be kept tight before the use of the hanger.

HOW TO OPERATE A VALVE: Steam valves, and especially large ones, should not be opened quickly at any time, for should water accumulate in the pipe, water hammer will immediately result, which should be constantly guarded against.

All of our valves have hand wheels of a diameter large enough to easily control the opening and closing of the valve under pressure. It is not necessary, therefore, to use a wrench on the hand wheel to secure additional leverage, and it very frequently happens, especially on small valves, that the same are utterly ruined by the use of this additional leverage.

Should a globe valve leak slightly, considerable damage often results by applying additional leverage to the hand wheel to obtain a tight joint. The valve should be reground as soon as possible, as this is the only effectual manner of securing a tight joint.

AREAS AND CIRCUMFERENCES OF CIRCLES.

Diam.	Area.	Circum.	Diam.	Area.	Circum.
$\frac{1}{16}$	.000192	.04909	$\frac{55}{16}$	.580038	2.69981
$\frac{1}{8}$	.000767	.09818	$\frac{57}{16}$	.601322	2.7489
$\frac{3}{16}$	.001726	.14726	$\frac{59}{16}$	.622989	2.79799
$\frac{1}{4}$	.003068	.19635	$\frac{61}{16}$	.645040	2.84707
$\frac{5}{16}$	.004794	.24544	$\frac{63}{16}$	.667475	2.89616
$\frac{3}{8}$	.006903	.29452	$\frac{65}{16}$	.690293	2.94525
$\frac{7}{16}$	.009396	.34361	$\frac{67}{16}$	.713494	2.99434
$\frac{1}{2}$	.012272	.3927	$\frac{69}{16}$	.737079	3.04342
$\frac{5}{8}$	.015532	.44179	$\frac{71}{16}$	.761048	3.09251
$\frac{3}{4}$	.019175	.4908	$\frac{73}{16}$	.7854	3.1416
$\frac{7}{8}$	.023202	.53996	$\frac{75}{16}$	.835254	3.23977
$\frac{15}{16}$	.027612	.58905	$\frac{77}{16}$	.886643	3.33795
$\frac{1}{8}$	.032405	.63814	$\frac{79}{16}$	.930565	3.436125
$\frac{1}{4}$	.037583	.68722	$\frac{81}{16}$	.994022	3.5343
$\frac{3}{8}$	.043143	.73631	$\frac{83}{16}$	1.050012	3.63247
$\frac{1}{2}$	.049087	.7854	$\frac{85}{16}$	1.107537	3.73065
$\frac{5}{8}$	.055415	.83449	$\frac{87}{16}$	1.166595	3.82882
$\frac{3}{4}$	.062126	.88357	$\frac{89}{16}$	1.227187	3.927
$\frac{7}{8}$	.069221	.93266	$\frac{91}{16}$	1.289314	4.02517
$\frac{15}{16}$	.076699	.98175	$\frac{93}{16}$	1.352974	4.12335
$\frac{1}{8}$	.084561	1.03084	$\frac{95}{16}$	1.418169	4.22152
$\frac{1}{4}$	.092806	1.07992	$\frac{97}{16}$	1.484897	4.3197
$\frac{3}{8}$	.101435	1.12901	$\frac{99}{16}$	1.553160	4.41787
$\frac{1}{2}$	.110447	1.1781	$\frac{101}{16}$	1.622955	4.51605
$\frac{5}{8}$	.119843	1.22719	$\frac{103}{16}$	1.694286	4.61422
$\frac{3}{4}$	.129622	1.27627	$\frac{105}{16}$	1.76715	4.7124
$\frac{7}{8}$	.139784	1.32536	$\frac{107}{16}$	1.841548	4.81057
$\frac{15}{16}$	.150330	1.37445	$\frac{109}{16}$	1.917480	4.90875
$\frac{1}{8}$	.161260	1.42354	$\frac{111}{16}$	1.994947	5.00692
$\frac{1}{4}$	.172573	1.47262	$\frac{113}{16}$	2.073947	5.1051
$\frac{3}{8}$	.184270	1.52171	$\frac{115}{16}$	2.154481	5.20327
$\frac{1}{2}$	.19635	1.5708	$\frac{117}{16}$	2.236549	5.30145
$\frac{5}{8}$	.208814	1.61989	$\frac{119}{16}$	2.320151	5.39962
$\frac{3}{4}$	.221661	1.66897	$\frac{121}{16}$	2.405287	5.4978
$\frac{7}{8}$	.234891	1.71806	$\frac{123}{16}$	2.491958	5.59597
$\frac{15}{16}$	.248505	1.76715	$\frac{125}{16}$	2.580162	5.69415
$\frac{1}{8}$	.262503	1.81606	$\frac{127}{16}$	2.669900	5.79232
$\frac{1}{4}$	.276884	1.86532	$\frac{129}{16}$	2.761172	5.8905
$\frac{3}{8}$	.291649	1.91441	$\frac{131}{16}$	2.853978	5.98867
$\frac{1}{2}$	.306797	1.9635	$\frac{133}{16}$	2.948318	6.08685
$\frac{5}{8}$	.322328	2.01259	$\frac{135}{16}$	3.044192	6.18502
$\frac{3}{4}$	.338244	2.06167	$\frac{137}{16}$	3.1416	6.2832
$\frac{7}{8}$	.354542	2.11076	$\frac{139}{16}$	3.24018	6.3814
$\frac{15}{16}$	.371224	2.15985	$\frac{141}{16}$	3.340572	6.47955
$\frac{1}{8}$	.388290	2.20894	$\frac{143}{16}$	3.44262	6.5777
$\frac{1}{4}$	.405739	2.25802	$\frac{145}{16}$	3.546087	6.6759
$\frac{3}{8}$	.423571	2.30711	$\frac{147}{16}$	3.650949	6.7741
$\frac{1}{2}$	.441788	2.3562	$\frac{149}{16}$	3.757255	6.87225
$\frac{5}{8}$	.460387	2.40529	$\frac{151}{16}$	3.865000	6.9704
$\frac{3}{4}$	.479370	2.45438	$\frac{153}{16}$	3.974172	7.0686
$\frac{7}{8}$	.498737	2.50346	$\frac{155}{16}$	4.084780	7.1668
$\frac{15}{16}$	.518487	2.55255	$\frac{157}{16}$	4.196831	7.26495
$\frac{1}{8}$	.538620	2.60164	$\frac{159}{16}$	4.310347	7.3631
$\frac{1}{4}$	.559137	2.65072	$\frac{161}{16}$	4.425425	7.4613
			$\frac{163}{16}$	4.542072	7.5595
			$\frac{165}{16}$	4.660293	7.6576
			$\frac{167}{16}$	4.779995	7.7557
			$\frac{169}{16}$	4.901172	7.8538
			$\frac{171}{16}$	5.023831	7.9519
			$\frac{173}{16}$	5.147970	8.0500
			$\frac{175}{16}$	5.273595	8.1481
			$\frac{177}{16}$	5.400712	8.2462
			$\frac{179}{16}$	5.529317	8.3443
			$\frac{181}{16}$	5.659407	8.4424
			$\frac{183}{16}$	5.790978	8.5405
			$\frac{185}{16}$	5.924027	8.6386
			$\frac{187}{16}$	6.058552	8.7367
			$\frac{189}{16}$	6.194549	8.8348
			$\frac{191}{16}$	6.332015	8.9329
			$\frac{193}{16}$	6.470950	9.0310
			$\frac{195}{16}$	6.611351	9.1291
			$\frac{197}{16}$	6.753215	9.2272
			$\frac{199}{16}$	6.896540	9.3253
			$\frac{201}{16}$	7.041323	9.4234
			$\frac{203}{16}$	7.187562	9.5215
			$\frac{205}{16}$	7.335255	9.6196
			$\frac{207}{16}$	7.484400	9.7177
			$\frac{209}{16}$	7.635005	9.8158
			$\frac{211}{16}$	7.787068	9.9139
			$\frac{213}{16}$	7.940587	10.0120
			$\frac{215}{16}$	8.095560	10.1101
			$\frac{217}{16}$	8.252085	10.2082
			$\frac{219}{16}$	8.409160	10.3063
			$\frac{221}{16}$	8.567783	10.4044
			$\frac{223}{16}$	8.727953	10.5025
			$\frac{225}{16}$	8.889668	10.6006
			$\frac{227}{16}$	9.052927	10.6987
			$\frac{229}{16}$	9.217738	10.7968
			$\frac{231}{16}$	9.384100	10.8949
			$\frac{233}{16}$	9.552011	10.9930
			$\frac{235}{16}$	9.721470	11.0911
			$\frac{237}{16}$	9.892487	11.1892
			$\frac{239}{16}$	10.064060	11.2873
			$\frac{241}{16}$	10.237187	11.3854
			$\frac{243}{16}$	10.411868	11.4835
			$\frac{245}{16}$	10.588091	11.5816
			$\frac{247}{16}$	10.764855	11.6797
			$\frac{249}{16}$	10.943160	11.7778
			$\frac{251}{16}$	11.123005	11.8759
			$\frac{253}{16}$	11.304390	11.9740
			$\frac{255}{16}$	11.487315	12.0721
			$\frac{257}{16}$	11.671780	12.1702
			$\frac{259}{16}$	11.857785	12.2683
			$\frac{261}{16}$	12.045330	12.3664
			$\frac{263}{16}$	12.234415	12.4645
			$\frac{265}{16}$	12.425040	12.5626
			$\frac{267}{16}$	12.617205	12.6607
			$\frac{269}{16}$	12.810910	12.7588
			$\frac{271}{16}$	13.006155	12.8569
			$\frac{273}{16}$	13.202940	12.9550
			$\frac{275}{16}$	13.401265	13.0531
			$\frac{277}{16}$	13.601130	13.1512
			$\frac{279}{16}$	13.802535	13.2493
			$\frac{281}{16}$	14.005480	13.3474
			$\frac{283}{16}$	14.209965	13.4455
			$\frac{285}{16}$	14.415990	13.5436
			$\frac{287}{16}$	14.623555	13.6417
			$\frac{289}{16}$	14.832660	13.7398
			$\frac{291}{16}$	15.043305	13.8379
			$\frac{293}{16}$	15.255490	13.9360
			$\frac{295}{16}$	15.469215	14.0341
			$\frac{297}{16}$	15.684480	14.1322
			$\frac{299}{16}$	15.901285	14.2303
			$\frac{301}{16}$	16.119630	14.3284
			$\frac{303}{16}$	16.339515	14.4265
			$\frac{305}{16}$	16.560940	14.5246
			$\frac{307}{16}$	16.783905	14.6227
			$\frac{309}{16}$	17.008410	14.7208
			$\frac{311}{16}$	17.234455	14.8189
			$\frac{313}{16}$	17.462040	14.9170
			$\frac{315}{16}$	17.691165	15.0151
			$\frac{317}{16}$	17.921830	15.1132
			$\frac{319}{16}$	18.154035	15.2113
			$\frac{321}{16}$	18.387780	15.3094
			$\frac{323}{16}$	18.623065	15.4075
			$\frac{325}{16}$	18.860890	15.5056
			$\frac{327}{16}$	19.100255	15.6037
			$\frac{329}{16}$	19.342160	15.7018
			$\frac{331}{16}$	19.585605	15.7999
			$\frac{333}{16}$	19.830590	15.8980
			$\frac{335}{16}$	20.077115	15.9961
			$\frac{337}{16}$	20.325180	16.0942
			$\frac{339}{16}$	20.574785	16.1923
			$\frac{341}{16}$	20.825930	16.2904
			$\frac{343}{16}$	21.078615	16.3885
			$\frac{345}{16}$	21.332840	16.4866
			$\frac{347}{16}$	21.588605	16.5847
			$\frac{349}{16}$	21.845910	16.6828
			$\frac{351}{16}$	22.104755	16.7809
			$\frac{353}{16}$	22.365140	16.8790
			$\frac{355}{16}$	22.627065	16.9771
			$\frac{357}{16}$	22.890530	17.0752
			$\frac{359}{16}$	23.155535	17.1733
			$\frac{361}{16}$	23.422080	17.2714
			$\frac{363}{16}$	23.690165	17.3695
			$\frac{365}{16}$	23.959790	17.4676
			$\frac{367}{16}$	24.230955	17.5657
			$\frac{369}{16}$	24.503660	17.6638
			$\frac{371}{16}$	24.777905	17.7619
			$\frac{373}{16}$	25.053690	17.8600
			$\frac{375}{16}$	25.331015	17.9581
			$\frac{377}{16}$	25.609880	18.0562
			$\frac{379}{16}$	25.890285	18.1543
			$\frac{381}{16}$	26.172230	18.2524
			$\frac{383}{16}$	26.455715	18.3505
			$\frac{385}{16}$	26.740740	18.4486
			$\frac{387}{16}$	27.027305	18.5467
			$\frac{389}{16}$	27.315410	18.6448
			$\frac{391}{16}$	27.605055	18.7429
			$\frac{393}{16}$	27.896240	18.8410
			$\frac{395}{16}$	28.188965	18.9391
			$\frac{397}{16}$	28.483230	19.0372
			$\frac{399}{16}$	28.779035	19.1353
			$\frac{401}{16}$	29.076380	19.2334
			$\frac{403}{16}$	29.375265	19.3315
			$\frac{405}{16}$	29.675690	19.4296
			$\frac{407}{16}$	29.977655	19.5277
			$\frac{409}{16}$	30.281160	19.6258
			$\frac{411}{16}$	30.586205	19.7239
			$\frac{413}{16}$	30.892790	19.8220
			$\frac{415}{16}$	31.200915	19.9201

Areas and Circumferences of Circles.—Continued.

Diam.	Area	Circum.	Diam.	Area	Circum.
2 ¹³ / ₁₆	6.212637	8.83575	9 ³ / ₈	69.029297	29.4525
2 ⁷ / ₈	6.491822	9.0321	9 ¹ / ₂	70.88235	29.8452
2 ¹⁵ / ₁₆	6.777143	9.22845	9 ⁵ / ₈	72.759947	30.2379
3	7.0686	9.4248	9 ⁷ / ₈	74.662087	30.6306
3 ¹ / ₈	7.669922	9.8175	9 ⁹ / ₈	76.588772	31.0233
3 ¹ / ₄	8.295787	10.2102	10	78.54	31.416
3 ³ / ₈	8.946197	10.6029	10 ¹ / ₈	80.515772	31.8087
3 ¹ / ₂	9.62115	10.9956	10 ¹ / ₄	82.516087	32.2014
3 ⁵ / ₈	10.320647	11.3883	10 ³ / ₈	84.540947	32.5941
3 ³ / ₄	11.044687	11.781	10 ⁵ / ₈	86.59035	32.9868
3 ⁷ / ₈	11.793272	12.1737	10 ⁷ / ₈	88.664297	33.3795
4	12.5664	12.5664	10 ⁹ / ₈	90.762787	33.7722
4 ¹ / ₈	13.364072	12.9591	10 ¹ / ₂	92.885822	34.1649
4 ¹ / ₄	14.186287	13.3518	11	95.0334	34.5576
4 ³ / ₈	15.033047	13.7445	11 ¹ / ₈	97.205522	34.9503
4 ¹ / ₂	15.90435	14.1372	11 ¹ / ₄	99.402187	35.343
4 ⁵ / ₈	16.800197	14.5299	11 ³ / ₈	101.623397	35.7357
4 ³ / ₄	17.720587	14.9226	11 ⁵ / ₈	103.86915	36.1284
4 ⁷ / ₈	18.665522	15.3153	11 ⁷ / ₈	106.139447	36.5211
5	19.635	15.708	11 ⁹ / ₈	108.434287	36.9138
5 ¹ / ₈	20.629022	16.1007	11 ¹ / ₂	110.753672	37.3065
5 ¹ / ₄	21.647587	16.4934	12	113.0976	37.6992
5 ³ / ₈	22.690697	16.8861	12 ¹ / ₈	115.466072	38.0919
5 ¹ / ₂	23.75835	17.2788	12 ¹ / ₄	117.859087	38.4846
5 ⁵ / ₈	24.850547	17.6715	12 ³ / ₈	120.276647	38.8773
5 ³ / ₄	25.967287	18.0642	12 ⁵ / ₈	122.71875	39.2700
5 ⁷ / ₈	27.108572	18.4569	12 ⁷ / ₈	125.185397	39.6627
6	28.2744	18.8496	12 ⁹ / ₈	127.676587	40.0554
6 ¹ / ₈	29.464772	19.2423	12 ¹ / ₂	130.192322	40.4481
6 ¹ / ₄	30.679687	19.6350	13	132.7326	40.8408
6 ³ / ₈	31.919147	20.0277	13 ¹ / ₈	135.297422	41.2335
6 ¹ / ₂	33.18315	20.4204	13 ¹ / ₄	137.886787	41.6262
6 ⁵ / ₈	34.471697	20.8131	13 ³ / ₈	140.500697	42.0189
6 ³ / ₄	35.784787	21.2058	13 ⁵ / ₈	143.13915	42.4116
6 ⁷ / ₈	37.122422	21.5985	13 ⁷ / ₈	145.802147	42.8043
7	38.4846	21.9912	13 ⁹ / ₈	148.489687	43.1970
7 ¹ / ₈	39.871322	22.3839	13 ¹ / ₂	151.201772	43.5897
7 ¹ / ₄	41.282587	22.7766	14	153.9384	43.9824
7 ³ / ₈	42.718397	23.1693	14 ¹ / ₈	156.699572	44.3751
7 ¹ / ₂	44.17875	23.562	14 ¹ / ₄	159.485287	44.7678
7 ⁵ / ₈	45.663647	23.9547	14 ³ / ₈	162.295547	45.1605
7 ³ / ₄	47.173087	24.3474	14 ⁵ / ₈	165.13035	45.5532
7 ⁷ / ₈	48.707072	24.7401	14 ⁷ / ₈	167.989697	45.9459
8	50.2656	25.1328	14 ⁹ / ₈	170.873587	46.3386
8 ¹ / ₈	51.848672	25.5255	14 ¹ / ₂	173.782022	46.7313
8 ¹ / ₄	53.456287	25.9182	15	176.715	47.124
8 ³ / ₈	55.088447	26.3109	15 ¹ / ₈	179.672522	47.5167
8 ¹ / ₂	56.74515	26.7036	15 ¹ / ₄	182.654587	47.9094
8 ⁵ / ₈	58.426397	27.0963	15 ³ / ₈	185.661197	48.3021
8 ³ / ₄	60.132187	27.4890	15 ⁵ / ₈	188.692356	48.6948
8 ⁷ / ₈	61.862522	27.8817	15 ⁷ / ₈	191.748047	49.0875
9	63.6174	28.2744	15 ⁹ / ₈	194.828287	49.4802
9 ¹ / ₈	65.396822	28.6671	15 ¹ / ₂	197.933072	49.8729
9 ¹ / ₄	67.200787	29.0598	16	201.0624	50.2656

THE LUNKENHEIMER COMPANY.
CINCINNATI, OHIO.

Areas and Circumferences of Circles.—Continued.

Diam.	Area.	Circum.	Diam.	Area.	Circum.
16 $\frac{1}{8}$	204.216272	50.6583	22 $\frac{1}{8}$	410.972822	71.8641
16 $\frac{1}{4}$	207.394687	51.051	23	415.4766	72.2568
16 $\frac{3}{8}$	210.597647	51.4437	23 $\frac{1}{8}$	420.004922	72.6495
16 $\frac{1}{2}$	213.82515	51.8364	23 $\frac{1}{4}$	424.557787	73.0422
16 $\frac{3}{4}$	217.077197	52.2291	23 $\frac{3}{8}$	429.135197	73.4349
16 $\frac{7}{8}$	220.353787	52.6218	23 $\frac{1}{2}$	433.73715	73.8276
16 $\frac{15}{16}$	223.654922	53.0145	23 $\frac{3}{4}$	438.363647	74.2203
17	226.9806	53.4072	23 $\frac{7}{8}$	443.014687	74.613
17 $\frac{1}{16}$	230.330822	53.7999	23 $\frac{15}{16}$	447.690272	75.0057
17 $\frac{1}{8}$	233.705587	54.1926	24	452.3904	75.3984
17 $\frac{1}{4}$	237.104897	54.5853	24 $\frac{1}{8}$	457.115072	75.7911
17 $\frac{3}{8}$	240.52875	54.9780	24 $\frac{1}{4}$	461.864287	76.1838
17 $\frac{1}{2}$	243.977147	55.3707	24 $\frac{3}{8}$	466.638047	76.5765
17 $\frac{3}{4}$	247.450087	55.7634	24 $\frac{1}{2}$	471.43635	76.9692
17 $\frac{7}{8}$	250.947572	56.1561	24 $\frac{3}{4}$	476.259197	77.3619
18	254.4696	56.5488	24 $\frac{7}{8}$	481.106587	77.7546
18 $\frac{1}{16}$	258.016172	56.9415	24 $\frac{15}{16}$	485.978522	78.1473
18 $\frac{1}{8}$	261.587287	57.3342	25	490.8750	78.5400
18 $\frac{1}{4}$	265.182947	57.7269	25 $\frac{1}{8}$	495.796022	78.9327
18 $\frac{3}{8}$	268.80315	58.1196	25 $\frac{1}{4}$	500.741587	79.3254
18 $\frac{1}{2}$	272.447897	58.5123	25 $\frac{3}{8}$	505.711697	79.7181
18 $\frac{3}{4}$	276.117187	58.905	25 $\frac{1}{2}$	510.70635	80.1108
18 $\frac{7}{8}$	279.811022	59.2977	25 $\frac{3}{4}$	515.725547	80.5035
19	283.5294	59.6904	25 $\frac{7}{8}$	520.769287	80.8962
19 $\frac{1}{16}$	287.272322	60.0831	25 $\frac{15}{16}$	525.837572	81.2889
19 $\frac{1}{8}$	291.039787	60.4758	26	530.9304	81.6816
19 $\frac{1}{4}$	294.831797	60.8685	26 $\frac{1}{8}$	535.189687	82.0743
19 $\frac{3}{8}$	298.64835	61.2612	26 $\frac{1}{4}$	540.4715	82.4670
19 $\frac{1}{2}$	302.489447	61.6539	26 $\frac{3}{8}$	545.754715	82.8597
19 $\frac{3}{4}$	306.355087	62.0466	26 $\frac{1}{2}$	551.037822	83.2524
19 $\frac{7}{8}$	310.245272	62.4393	26 $\frac{3}{4}$	556.320872	83.6451
20	314.16	62.832	26 $\frac{7}{8}$	561.604022	84.0378
20 $\frac{1}{16}$	318.099272	63.2247	26 $\frac{15}{16}$	566.880272	84.4305
20 $\frac{1}{8}$	322.063087	63.6174	27	572.15566	84.8232
20 $\frac{1}{4}$	326.051447	64.0101	27 $\frac{1}{8}$	577.436872	85.2159
20 $\frac{3}{8}$	330.06435	64.4028	27 $\frac{1}{4}$	582.718022	85.6086
20 $\frac{1}{2}$	334.101797	64.7955	27 $\frac{3}{8}$	588.000272	86.0013
20 $\frac{3}{4}$	338.163787	65.1882	27 $\frac{1}{2}$	593.281522	86.3940
20 $\frac{7}{8}$	342.250322	65.5809	27 $\frac{3}{4}$	598.562772	86.7867
21	346.3614	65.9736	27 $\frac{7}{8}$	603.844022	87.1794
21 $\frac{1}{16}$	350.497022	66.3663	28	609.125272	87.5721
21 $\frac{1}{8}$	354.657187	66.759	28 $\frac{1}{8}$	614.406522	87.9648
21 $\frac{1}{4}$	358.841896	67.1517	28 $\frac{1}{4}$	619.687772	88.3575
21 $\frac{3}{8}$	363.05115	67.5444	28 $\frac{3}{8}$	624.969022	88.7502
21 $\frac{1}{2}$	367.284047	67.9371	28 $\frac{1}{2}$	630.250272	89.1429
21 $\frac{3}{4}$	371.543287	68.3298	28 $\frac{3}{4}$	635.531522	89.5356
21 $\frac{7}{8}$	375.826172	68.7225	29	640.812772	89.9283
22	380.126	69.1152	29 $\frac{1}{8}$	646.094022	90.3210
22 $\frac{1}{16}$	384.465572	69.5079	29 $\frac{1}{4}$	651.375272	90.7137
22 $\frac{1}{8}$	388.822087	69.9006	29 $\frac{3}{8}$	656.656522	91.1064
22 $\frac{1}{4}$	393.203147	70.2933	29 $\frac{1}{2}$	661.937772	91.4991
22 $\frac{3}{8}$	397.60875	70.686	29 $\frac{3}{4}$	667.219022	91.8918
22 $\frac{1}{2}$	402.038897	71.0787	30	672.500272	92.2845
22 $\frac{3}{4}$	406.493587	71.4714	30 $\frac{1}{8}$	677.781522	92.6772
			30 $\frac{1}{4}$	683.062772	93.0699
			30 $\frac{3}{8}$	688.344022	93.4626
			30 $\frac{1}{2}$	693.625272	93.8553
			30 $\frac{3}{4}$	698.906522	94.248
			31	704.187772	94.6407
			31 $\frac{1}{8}$	709.469022	95.0334
			31 $\frac{1}{4}$	714.750272	95.4261
			31 $\frac{3}{8}$	720.031522	95.8188
			31 $\frac{1}{2}$	725.312772	96.2115
			31 $\frac{3}{4}$	730.594022	96.6042
			32	735.875272	96.9969
			32 $\frac{1}{8}$	741.156522	97.3896
			32 $\frac{1}{4}$	746.437772	97.7823
			32 $\frac{3}{8}$	751.719022	98.175
			32 $\frac{1}{2}$	757.000272	98.5677
			32 $\frac{3}{4}$	762.281522	98.9604
			33	767.562772	99.3531
				772.844022	99.7458
				778.125272	100.1385
				783.406522	100.5312
				788.687772	100.9239
				793.969022	101.3166
				799.250272	101.7093
				804.531522	102.102
				809.812772	102.4947
				815.094022	102.8874
				820.375272	103.2801
				825.656522	103.6728

Areas and Circumferences of Circles.—Continued.

Diam.	Area.	Circum.	Diam.	Area.	Circum.
33 $\frac{1}{4}$	868.308787	104.4582	46 $\frac{3}{4}$	1716.54079	146.8698
33 $\frac{1}{2}$	881.41515	105.2436	47	1734.9486	147.6552
33 $\frac{3}{4}$	894.619687	106.029	47 $\frac{1}{4}$	1753.45459	148.4406
34	907.9224	106.8144	47 $\frac{1}{2}$	1772.05875	149.226
34 $\frac{1}{4}$	921.323287	107.5998	47 $\frac{3}{4}$	1790.76109	150.0114
34 $\frac{1}{2}$	934.82235	108.3852	48	1809.5616	150.7968
34 $\frac{3}{4}$	948.419587	109.1706	48 $\frac{1}{4}$	1828.46029	151.5822
35	962.1150	109.956	48 $\frac{1}{2}$	1847.45715	152.3676
35 $\frac{1}{4}$	975.908587	110.7414	48 $\frac{3}{4}$	1866.55219	153.153
35 $\frac{1}{2}$	989.80035	111.5268	49	1885.7454	153.9384
35 $\frac{3}{4}$	1003.79029	112.3122	49 $\frac{1}{4}$	1905.03679	154.7238
36	1017.7874	113.0976	49 $\frac{1}{2}$	1924.42635	155.5092
36 $\frac{1}{4}$	1032.06469	113.883	49 $\frac{3}{4}$	1943.91409	156.2948
36 $\frac{1}{2}$	1046.34915	114.6684	50	1963.50	157.080
36 $\frac{3}{4}$	1060.73179	115.4538	50 $\frac{1}{4}$	1983.18409	157.8654
37	1075.2126	116.2392	50 $\frac{1}{2}$	2002.96635	158.6508
37 $\frac{1}{4}$	1089.79159	117.0246	50 $\frac{3}{4}$	2022.84679	159.4362
37 $\frac{1}{2}$	1104.46875	117.81	51	2042.8254	160.2216
37 $\frac{3}{4}$	1119.24409	118.5954	51 $\frac{1}{4}$	2062.90219	161.007
38	1134.1176	119.3808	51 $\frac{1}{2}$	2083.07715	161.7924
38 $\frac{1}{4}$	1149.08929	120.1662	51 $\frac{3}{4}$	2103.35029	162.5778
38 $\frac{1}{2}$	1164.15915	120.9516	52	2123.7216	163.3632
38 $\frac{3}{4}$	1179.32719	121.737	52 $\frac{1}{4}$	2144.19109	164.1486
39	1194.5934	122.5224	52 $\frac{1}{2}$	2164.75875	164.9340
39 $\frac{1}{4}$	1209.95779	123.3078	52 $\frac{3}{4}$	2185.42459	165.7194
39 $\frac{1}{2}$	1225.42035	124.0932	53	2206.1886	166.5048
39 $\frac{3}{4}$	1240.98109	124.8786	53 $\frac{1}{4}$	2227.05079	167.2902
40	1256.64	125.664	53 $\frac{1}{2}$	2248.01115	168.0756
40 $\frac{1}{4}$	1272.39709	126.4494	53 $\frac{3}{4}$	2269.06969	168.8610
40 $\frac{1}{2}$	1288.25235	127.2348	54	2290.2264	169.6464
40 $\frac{3}{4}$	1304.20579	128.0202	54 $\frac{1}{4}$	2311.48129	170.4318
41	1320.2574	128.8056	54 $\frac{1}{2}$	2332.83435	171.2172
41 $\frac{1}{4}$	1336.40719	129.591	54 $\frac{3}{4}$	2354.28559	172.0026
41 $\frac{1}{2}$	1352.65515	130.3764	55	2375.8350	172.7880
41 $\frac{3}{4}$	1369.00129	131.1618	55 $\frac{1}{4}$	2397.48259	173.5734
42	1385.4456	131.9472	55 $\frac{1}{2}$	2419.22835	174.3588
42 $\frac{1}{4}$	1401.98809	132.7326	55 $\frac{3}{4}$	2441.07229	175.1442
42 $\frac{1}{2}$	1418.62875	133.518	56	2463.0144	175.9296
42 $\frac{3}{4}$	1435.36759	134.3034	56 $\frac{1}{4}$	2485.05	176.715
43	1452.2046	135.0888	56 $\frac{1}{2}$	2507.19	177.5
43 $\frac{1}{4}$	1469.13979	135.8742	56 $\frac{3}{4}$	2529.43	178.286
43 $\frac{1}{2}$	1486.17315	136.6596	57	2551.76	179.071
43 $\frac{3}{4}$	1503.30469	137.445	57 $\frac{1}{4}$	2574.2	179.857
44	1520.5344	138.2304	57 $\frac{1}{2}$	2596.73	180.642
44 $\frac{1}{4}$	1537.86229	139.0158	57 $\frac{3}{4}$	2619.36	181.427
44 $\frac{1}{2}$	1555.28835	139.8012	58	2642.09	182.213
44 $\frac{3}{4}$	1572.81259	140.5866	58 $\frac{1}{4}$	2664.91	182.998
45	1590.435	141.372	58 $\frac{1}{2}$	2687.84	183.784
45 $\frac{1}{4}$	1608.15559	142.1574	58 $\frac{3}{4}$	2710.86	184.569
45 $\frac{1}{2}$	1625.97435	142.9428	59	2733.98	185.354
45 $\frac{3}{4}$	1643.89129	143.7282	59 $\frac{1}{4}$	2757.2	186.14
46	1661.9064	144.5136	59 $\frac{1}{2}$	2780.51	186.925
46 $\frac{1}{4}$	1680.01969	145.299	59 $\frac{3}{4}$	2803.93	187.711
46 $\frac{1}{2}$	1698.23115	146.0844	60	2827.44	188.496

Areas and Circumferences of Circles.—Continued.

Diam.	Area.	Circum.	Diam.	Area.	Circum.
60 $\frac{1}{4}$	2851.05	189.281	73 $\frac{3}{4}$	4271.84	231.693
60 $\frac{1}{2}$	2874.76	190.067	74	4300.85	232.478
60 $\frac{3}{4}$	2898.57	190.852	74 $\frac{1}{4}$	4329.96	233.264
61	2922.47	191.638	74 $\frac{1}{2}$	4359.17	234.049
61 $\frac{1}{4}$	2946.48	192.423	74 $\frac{3}{4}$	4388.47	234.835
61 $\frac{1}{2}$	2970.58	193.208	75	4417.87	235.62
61 $\frac{3}{4}$	2994.78	193.994	75 $\frac{1}{4}$	4447.38	236.405
62	3019.08	194.779	75 $\frac{1}{2}$	4476.98	237.191
62 $\frac{1}{4}$	3043.47	195.565	75 $\frac{3}{4}$	4506.67	237.976
62 $\frac{1}{2}$	3067.97	196.35	76	4536.47	238.762
62 $\frac{3}{4}$	3092.56	197.135	76 $\frac{1}{4}$	4566.36	239.547
63	3117.25	197.921	76 $\frac{1}{2}$	4596.36	240.332
63 $\frac{1}{4}$	3142.04	198.706	76 $\frac{3}{4}$	4626.45	241.118
63 $\frac{1}{2}$	3166.93	199.492	77	4656.64	241.903
63 $\frac{3}{4}$	3191.91	200.277	77 $\frac{1}{4}$	4686.92	242.689
64	3217	201.062	77 $\frac{1}{2}$	4717.31	243.474
64 $\frac{1}{4}$	3242.18	201.848	77 $\frac{3}{4}$	4747.79	244.259
64 $\frac{1}{2}$	3267.46	202.633	78	4778.37	245.045
64 $\frac{3}{4}$	3292.84	203.419	78 $\frac{1}{4}$	4809.05	245.83
65	3318.31	204.204	78 $\frac{1}{2}$	4839.83	246.616
65 $\frac{1}{4}$	3343.89	204.989	78 $\frac{3}{4}$	4870.71	247.401
65 $\frac{1}{2}$	3369.56	205.775	79	4901.68	248.186
65 $\frac{3}{4}$	3395.33	206.56	79 $\frac{1}{4}$	4932.75	248.972
66	3421.2	207.346	79 $\frac{1}{2}$	4963.92	249.757
66 $\frac{1}{4}$	3447.17	208.131	79 $\frac{3}{4}$	4995.19	250.543
66 $\frac{1}{2}$	3473.24	208.916	80	5026.56	251.328
66 $\frac{3}{4}$	3499.4	209.702	80 $\frac{1}{4}$	5058.03	252.113
67	3525.66	210.487	80 $\frac{1}{2}$	5089.59	252.899
67 $\frac{1}{4}$	3552.02	211.273	80 $\frac{3}{4}$	5121.25	253.684
67 $\frac{1}{2}$	3578.48	212.058	81	5153.01	254.47
67 $\frac{3}{4}$	3605.04	212.843	81 $\frac{1}{4}$	5184.87	255.255
68	3631.69	213.629	81 $\frac{1}{2}$	5216.82	256.04
68 $\frac{1}{4}$	3658.44	214.414	81 $\frac{3}{4}$	5248.88	256.826
68 $\frac{1}{2}$	3685.29	215.2	82	5281.03	257.611
68 $\frac{3}{4}$	3712.24	215.985	82 $\frac{1}{4}$	5313.28	258.397
69	3739.29	216.77	82 $\frac{1}{2}$	5345.63	259.182
69 $\frac{1}{4}$	3766.43	217.556	82 $\frac{3}{4}$	5378.08	259.967
69 $\frac{1}{2}$	3793.68	218.341	83	5410.62	260.753
69 $\frac{3}{4}$	3821.02	219.127	83 $\frac{1}{4}$	5443.26	261.538
70	3848.46	219.912	83 $\frac{1}{2}$	5476.01	262.324
70 $\frac{1}{4}$	3876	220.697	83 $\frac{3}{4}$	5508.84	263.109
70 $\frac{1}{2}$	3903.63	221.483	84	5541.78	263.894
70 $\frac{3}{4}$	3931.37	222.268	84 $\frac{1}{4}$	5574.82	264.68
71	3959.2	223.054	84 $\frac{1}{2}$	5507.95	265.465
71 $\frac{1}{4}$	3987.13	223.839	84 $\frac{3}{4}$	5641.18	266.251
71 $\frac{1}{2}$	4015.16	224.624	85	5674.51	267.036
71 $\frac{3}{4}$	4043.29	225.41	85 $\frac{1}{4}$	5707.94	267.821
72	4071.51	226.195	85 $\frac{1}{2}$	5741.47	268.607
72 $\frac{1}{4}$	4099.84	226.981	85 $\frac{3}{4}$	5775.1	269.392
72 $\frac{1}{2}$	4128.26	227.766	86	5808.82	270.178
72 $\frac{3}{4}$	4156.78	228.551	86 $\frac{1}{4}$	5842.64	270.963
73	4185.4	229.337	86 $\frac{1}{2}$	5876.56	271.748
73 $\frac{1}{4}$	4214.11	230.122	86 $\frac{3}{4}$	5910.58	272.534
73 $\frac{1}{2}$	4242.93	230.908	87	5944.69	273.3192

Areas and Circumferences of Circles.—Continued.

Diam.	Area.	Circum.	Diam.	Area.	Circum.
87 ¼	5978.91	274.105	94 ¼	6976.76	296.096
87 ½	6013.22	274.89	94 ½	7013.82	296.881
87 ¾	6047.63	275.675	94 ¾	7050.98	297.667
88	6082.18	276.461	95	7088.23	298.452
88 ¼	6116.74	277.246	95 ¼	7125.59	299.237
88 ½	6151.45	278.032	95 ½	7163.04	300.023
88 ¾	6186.25	278.817	95 ¾	7200.6	300.808
89	6221.15	279.602	96	7238.25	301.594
89 ¼	6256.15	280.388	96 ¼	7275.99	302.379
89 ½	6291.25	281.173	96 ½	7313.84	303.164
89 ¾	6326.45	281.959	96 ¾	7351.79	303.95
90	6361.74	282.744	97	7389.83	304.735
90 ¼	6397.13	283.529	97 ¼	7427.97	305.521
90 ½	6432.62	284.315	97 ½	7466.21	306.306
90 ¾	6468.21	285.1	97 ¾	7504.55	307.091
91	6503.9	285.886	98	7542.98	307.877
91 ¼	6539.68	286.671	98 ¼	7581.52	308.662
91 ½	6575.56	287.456	98 ½	7620.15	309.448
91 ¾	6611.55	288.242	98 ¾	7658.88	310.233
92	6647.63	289.027	99	7697.71	311.018
92 ¼	6683.8	289.813	99 ¼	7736.63	311.804
92 ½	6720.08	290.598	99 ½	7775.66	312.589
92 ¾	6756.45	291.383	99 ¾	7814.78	313.375
93	6792.92	292.169	100	7854	314.16
93 ¼	6829.49	292.954	100 ¼	7893.32	314.945
93 ½	6866.16	293.74	100 ½	7932.74	315.731
93 ¾	6902.93	294.525	100 ¾	7972.25	316.516
94	6939.79	295.31			

The foregoing table will be found especially useful in figuring out sizes of Pop Valves.

In determining size of Pop Valve for boiler (see pages 158 to 169) take, for example, one which has 21 square feet of grate surface, divide this amount by 3 to allow for the usual ratio between valve area and grate surface, and the result will be 7, the number of square inches of valve area necessary. Reference to the table will show that a 3 inch valve has the diameter necessary to give the required area.

TABLE OF DECIMAL EQUIVALENTS OF AN INCH.

By 8ths, 16ths, 32ds and 64ths.

8ths.	32ds.	64ths.	64ths Continued.
$\frac{1}{8}$ = .125	$\frac{1}{32}$ = .03125	$\frac{1}{64}$ = .015625	$\frac{11}{64}$ = .515625
$\frac{1}{4}$ = .250	$\frac{1}{16}$ = .0625	$\frac{1}{32}$ = .03125	$\frac{13}{64}$ = .546875
$\frac{3}{8}$ = .375	$\frac{3}{64}$ = .046875	$\frac{1}{16}$ = .0625	$\frac{15}{64}$ = .578125
$\frac{1}{2}$ = .500	$\frac{1}{8}$ = .125	$\frac{1}{8}$ = .125	$\frac{17}{64}$ = .609375
$\frac{5}{8}$ = .625	$\frac{1}{4}$ = .250	$\frac{1}{4}$ = .250	$\frac{19}{64}$ = .640625
$\frac{3}{4}$ = .750	$\frac{1}{2}$ = .500	$\frac{1}{2}$ = .500	$\frac{21}{64}$ = .671875
$\frac{7}{8}$ = .875	$\frac{3}{4}$ = .750	$\frac{3}{4}$ = .750	$\frac{23}{64}$ = .703125
16ths.	$\frac{1}{16}$ = .0625	$\frac{1}{32}$ = .03125	$\frac{25}{64}$ = .734375
$\frac{1}{8}$ = .125	$\frac{1}{8}$ = .125	$\frac{1}{16}$ = .0625	$\frac{27}{64}$ = .765625
$\frac{3}{16}$ = .1875	$\frac{3}{16}$ = .1875	$\frac{1}{8}$ = .125	$\frac{29}{64}$ = .796875
$\frac{1}{4}$ = .250	$\frac{1}{4}$ = .250	$\frac{3}{16}$ = .1875	$\frac{31}{64}$ = .828125
$\frac{5}{16}$ = .3125	$\frac{5}{16}$ = .3125	$\frac{1}{4}$ = .250	$\frac{33}{64}$ = .859375
$\frac{3}{8}$ = .375	$\frac{3}{8}$ = .375	$\frac{5}{16}$ = .3125	$\frac{35}{64}$ = .890625
$\frac{1}{2}$ = .500	$\frac{1}{2}$ = .500	$\frac{1}{2}$ = .500	$\frac{37}{64}$ = .921875
$\frac{5}{8}$ = .625	$\frac{5}{8}$ = .625	$\frac{5}{8}$ = .625	$\frac{39}{64}$ = .953125
$\frac{3}{4}$ = .750	$\frac{3}{4}$ = .750	$\frac{3}{4}$ = .750	$\frac{41}{64}$ = .984375
$\frac{7}{8}$ = .875	$\frac{7}{8}$ = .875	$\frac{7}{8}$ = .875	

TABLE OF DECIMAL EQUIVALENTS OF AN INCH.

By 64ths; from 1-64th to 1 Inch.

Fraction.	Decimal.	Fraction.	Decimal.	Fraction.	Decimal.	Fraction.	Decimal.
$\frac{1}{64}$	.015625	$\frac{1}{32}$	.031250	$\frac{1}{16}$	.062500	$\frac{1}{8}$	.125000
$\frac{2}{64}$	.031250	$\frac{2}{32}$	.062500	$\frac{2}{16}$	.125000	$\frac{2}{8}$	.250000
$\frac{3}{64}$	.046875	$\frac{3}{32}$	.093750	$\frac{3}{16}$	.187500	$\frac{3}{8}$	.375000
$\frac{4}{64}$	.062500	$\frac{4}{32}$	.125000	$\frac{4}{16}$	.250000	$\frac{4}{8}$	.500000
$\frac{5}{64}$	.078125	$\frac{5}{32}$	.156250	$\frac{5}{16}$	.312500	$\frac{5}{8}$	.625000
$\frac{6}{64}$	.093750	$\frac{6}{32}$	.187500	$\frac{6}{16}$	.375000	$\frac{6}{8}$	.750000
$\frac{7}{64}$	.109375	$\frac{7}{32}$	.218750	$\frac{7}{16}$	.437500	$\frac{7}{8}$	.875000
$\frac{8}{64}$	.125000	$\frac{8}{32}$	.250000	$\frac{8}{16}$	.500000	$\frac{8}{8}$	1.000000
$\frac{9}{64}$	.140625	$\frac{9}{32}$	.281250	$\frac{9}{16}$	.562500		
$\frac{10}{64}$	.156250	$\frac{10}{32}$	.312500	$\frac{10}{16}$	.625000		
$\frac{11}{64}$	.171875	$\frac{11}{32}$	.343750	$\frac{11}{16}$	.687500		
$\frac{12}{64}$	.187500	$\frac{12}{32}$	.375000	$\frac{12}{16}$	.750000		
$\frac{13}{64}$	.203125	$\frac{13}{32}$	.406250	$\frac{13}{16}$	.812500		
$\frac{14}{64}$	.218750	$\frac{14}{32}$	.437500	$\frac{14}{16}$	.875000		
$\frac{15}{64}$	.234375	$\frac{15}{32}$	.468750	$\frac{15}{16}$	.937500		
$\frac{16}{64}$	.250000	$\frac{16}{32}$	.500000	$\frac{16}{16}$	1.000000		

COMPARATIVE TABLE OF THE UNITED STATES AND METRIC SYSTEMS.

Denomination.	Equivalent
One grain equals in grammes.....	0.0648
One pound avoirdupois equals in kilogrammes.....	0.4536
One ton of 2240 pounds equals in tonnes.....	1.0160
One ton of 2000 pounds equals in tonnes.....	0.9071
One inch equals in millimetres	25.400
One foot equals in metres.....	0.3048
One mile equals in kilometres.....	1.6094
One square inch equals in square millimetres.....	645.2
One square foot equals in square metres.....	0.09291
One acre equals in ares (100 square metres)	40.47
One square mile equals in square kilometres.....	2.590
One cubic inch equals in cubic centimetres.....	16.39
One cubic foot equals in cubic metres.....	0.02832
One cubic yard equals in cubic metres.....	0.7646
One quart dry measure equals in litres.....	1.101
One quart liquid or wine measure equals in litres.....	0.9465
One foot pound equals in kilogrammetres.....	0.1383
One pound per foot equals in kilogrammes per metre.....	1.488
One thousand pounds per square inch equals in kilogrammes per square millimetres	0.703
One pound per square foot equals in kilogrammes per square metre.....	4.882
One pound per cubic foot equals in kilogrammes per cubic metre.....	16.02
One degree Fahrenheit equals in degrees Centigrade.....	0.5556

COMPARATIVE TABLE OF THE METRIC AND UNITED STATES SYSTEMS.

One gramme equals in grains.....	15.433
One kilogramme equals in pounds avoirdupois.....	2.2047
One tonne equals in tons of 2240 pounds.....	0.9843
One tonne equals in tons of 2000 pounds.....	1.1024
One millimetre equals in inches.....	0.0394
One metre equals in feet.....	3.2807
One kilometre equals in miles.....	0.6213

Comparative Table of the United States and Metric Systems.

—Continued.

Denomination.	Equivalent.
One square millimetre equals in square inches.....	0.00155
One square metre equals in square feet.....	10.763
One are (100 square metres) equals in acres.....	0.02471
One square kilometre equals in square miles.....	0.3861
One cubic centimetre equals in cubic inches.....	0.0610
One cubic metre or stere equals in cubic feet.....	35.3105
One cubic metre equals in cubic yards.....	1.3078
One litre (one cubic decimetre) equals in cubic inches.....	61.017
One litre equals in quarts, dry measure.....	0.908
One litre equals in quarts, liquid or wine measure.....	1.0566
One kilogramme equals in foot pounds.....	7.2331
One kilogramme per metre equals in pounds per foot.....	0.6720
One kilogramme per sq. millimetre equals in pounds per sq. inch.....	1422.
One kilogramme per sq. metre equals in pounds per sq. foot.....	0.2048
One kilogramme per cubic metre equals in pounds per cubic foot.....	0.0624
One degree Centigrade equals in degrees Fahrenheit.....	1.8

METRIC CONVERSION TABLE.

Millimetres $\times .03937$ = inches.
 Millimetres $\div 25.4$ = inches.
 Centimetres $\times .3937$ = inches.
 Centimetres $\div 2.54$ = inches.
 Metres $\times 39.37$ = inches.
 Metres $\times 3.281$ = feet.
 Metres $\times 1.094$ = yards.
 Kilometres $\times .621$ = miles.
 Kilometres $\div 1.6093$ = miles.
 Kilometres $\times 3280.8693$ = feet.
 Sq. Millimetres $\times .00155$ = sq. in.
 Sq. Millimetres $\div 645.1$ = sq. in.
 Sq. Centimetres $\times .155$ = sq. in.
 Sq. Centimetres $\div 6.451$ = sq. in.
 Sq. Metres $\times 10.764$ = sq. ft.
 Sq. Kilometres $\times 247.1$ = acres.
 Hectare $\times 2.471$ = acres.
 Cu. Centimetres $\div 16.383$ = cu. in.
 Cu. Centimetres $\div 3.69$ = fl. drams.
 Cu. Centimetres $\div 29.57$ = fluid oz.
 Cu. Metres $\times 35.315$ = cu. ft.
 Cu. Metres $\times 1.308$ = cu. yds.
 Cu. Metres $\times 264.2$ = gals. (231 cu. in.)
 Litres $\times 61.022$ = cu. in.
 Litres $\times 33.84$ = fluid oz.
 Litres $\times .2642$ = gals. (231 cu. in.)
 Litres $\div 3.78$ = gals. (231 cu. in.)
 Litres $\div 28.316$ = cu. ft.
 Hectolitres $\times 3.531$ = cu. ft.
 Hectolitres $\times 2.84$ = Bu. (2150.42 cu. in.)

Hectolitres $\times .131$ = cu. yds.
 Hectolitres $\div 26.42$ = gals. (231 cu. in.)
 Grammes $\times 15.432$ = grains.
 Grammes $\div 981$ = dynes.
 Grammes (water) $\div 29.57$ = fluid oz.
 Grammes $\div 28.35$ = oz. avoirdupois.
 Grammes per cu. cent. $\div 27.7$ = lbs. p. cu. in.

Joule $\times .7373$ = ft. lbs.
 Kilo-grammes $\times 2.2046$ = pounds.
 Kilo-grammes $\times 35.3$ = oz. avoirdupois.
 Kilo-grammes $\div 907.2$ = tons (2000 lbs.)
 Kilo-gr. p. sq. cent. $\times 14.223$ = lbs. p. sq. in.
 Kilo-gram.-metres $\times 7.233$ = ft. lbs.
 Kilo-gr. p. Metre $\times .672$ = lbs. per. ft.
 Kilo-gr. p. cu. Metre $\times .062$ = lbs. p. cu. ft.
 Kilo-gr. p. Cheval $\times 2.235$ = lbs. p. H. P.

Kilo-Watts $\times 1.34$ = Horsepower.
 Watts $\div 746$ = Horsepower.
 Watts $\times .7373$ = ft. pounds p. second.
 Calorie $\times 3.968$ = B. T. U.
 Cheval vapeur $\times .9863$ = Horsepower.
 (Centigrade $\times 1.8$) $\div 32$ = deg'e Fahr.
 Franc $\times .193$ = Dollars.
 Gravity Paris = 980.94 centimetres per sec.

STEAM.

SATURATED STEAM—Steam at a given temperature is said to be saturated when it is of maximum density for that temperature. Steam in contact with water is saturated steam.

WET OR SUPERSATURATED STEAM—Steam which has water (in the form of small drops) suspended in it is called wet or supersaturated steam. If wet steam be heated until all the water suspended in it is evaporated, it is said to be dried.

SUPERHEATED STEAM—If dry saturated steam be heated when not in contact with water, its temperature is raised and its density diminished or its pressure is raised. The steam is then said to be superheated.

DRYNESS FRACTION OF STEAM—Let W = weight of a given quantity of wet steam, w = weight of water suspended in this steam, then dryness fraction $= \frac{W-w}{W}$.

Under ordinary conditions and good stoking, the dryness fraction is about 95 per cent.

PROPERTIES OF SATURATED STEAM—Nearly all published tables giving the properties of saturated steam have been constructed on empirical formulæ based on the researches of Regnault. The table given on pp. 555-558 has been prepared with great care after comparing the tables given by Clark, Cotterill, Dwelshauvers-Dery, Marfarlane, Gray, Peabody, Thurston, Weisbach, and others. The temperature t was first decided on by a system of averaging and plotting, H was then calculated from the formula, $H = 1081.94 + .305t$.

The quantity $t-h$ was next determined in the same way as t was found, and this decided the value of h . Then, $L=H-h$. w was next determined, and then $v = \frac{1}{w}$.

The quantities H , h and L are for one pound weight of steam or water.
 p = absolute pressure, or pressure above a perfect vacuum, in lbs. per square inch.
 t = temperature in degrees Fahrenheit.
 H = total heat in the steam above that in water at 32° .
 h = heat in water (at t°) above that in water at 32° .
 L = latent heat or heat of vaporization = $H-h$.
 w = weight of one cubic foot of steam in lbs.
 v = volume of one pound weight of steam in cubic feet = $\frac{1}{w}$.

Quantities of heat are expressed in British thermal units.

PROPERTIES OF SATURATED STEAM.

p	t	H	h	L	w	v	p
0.5	79.9	1106.3	47.9	1058.4	.00157	636.9	0.5
1	102.0	1113.1	70.0	1043.1	.0030	333.3	1
1.5	115.9	1117.3	84.0	1033.3	.0044	227.3	1.5
2	126.3	1120.5	94.4	1026.1	.0058	172.4	2
2.5	134.6	1123.0	102.8	1020.2	.0071	140.8	2.5
3	141.6	1125.1	109.8	1015.3	.0085	117.6	3
3.5	147.7	1127.0	116.0	1011.0	.0098	102.0	3.5
4	153.1	1128.6	121.5	1007.1	.0111	90.9	4
4.5	157.9	1130.1	126.3	1003.8	.0124	80.65	4.5
5	162.3	1131.4	130.7	1000.7	.0137	72.99	5
5.5	166.4	1132.7	134.8	997.9	.0150	66.67	5.5
6	170.1	1133.8	138.6	995.2	.0163	61.35	6
6.5	173.6	1134.9	142.1	992.8	.0176	56.82	6.5
7	176.9	1135.9	145.4	990.5	.0189	52.91	7
7.5	180.0	1136.8	148.5	988.3	.0202	49.50	7.5
8	182.9	1137.7	151.5	986.2	.0214	46.73	8
8.5	185.7	1138.6	154.3	984.3	.0227	44.05	8.5
9	188.3	1139.4	156.9	982.5	.0239	41.84	9
9.5	190.8	1140.1	159.4	980.7	.0252	39.68	9.5
10	193.2	1140.9	161.8	979.1	.0264	37.83	10
10.5	195.6	1141.6	164.2	977.4	.0276	36.43	10.5
11	197.8	1142.3	166.5	975.8	.0288	34.72	11
11.5	199.9	1142.9	168.6	974.3	.0301	33.22	11.5
12	202.0	1143.6	170.7	972.9	.0313	31.95	12
12.5	204.0	1144.2	172.7	971.5	.0326	30.67	12.5
13	205.9	1144.7	174.7	970.0	.0338	29.59	13
13.5	207.8	1145.3	176.6	968.7	.0350	28.57	13.5
14	209.6	1145.9	178.4	967.5	.0362	27.62	14
14.7	212.0	1146.6	180.8	965.8	.0379	26.39	14.7
15	213.0	1146.9	181.8	965.1	.0386	25.91	15
16	216.3	1147.9	185.2	962.7	.0410	24.39	16
17	219.4	1148.9	188.3	960.6	.0434	23.04	17
18	222.4	1149.8	191.3	958.5	.0458	21.83	18
19	225.2	1150.6	194.1	956.5	.0482	20.75	19
20	227.9	1151.4	196.8	954.6	.0506	19.76	20
21	230.5	1152.2	199.5	952.7	.0530	18.87	21
22	233.1	1153.0	202.1	950.9	.0553	18.08	22
23	235.5	1153.8	204.5	949.3	.0577	17.33	23
24	237.8	1154.5	206.8	947.7	.0601	16.64	24
25	240.0	1155.1	209.1	946.0	.0624	16.03	25
26	242.2	1155.8	211.3	944.5	.0648	15.43	26
27	244.3	1156.5	213.4	943.1	.0671	14.90	27
28	246.3	1157.1	215.5	941.6	.0695	14.39	28
29	248.3	1157.7	217.5	940.2	.0718	13.93	29
30	250.3	1158.3	219.5	938.8	.0741	13.50	30
31	252.2	1158.9	221.4	937.5	.0764	13.09	31
32	254.0	1159.4	223.2	936.2	.0787	12.71	32
33	255.8	1160.0	225.0	935.0	.0810	12.35	33
34	257.5	1160.5	226.8	933.7	.0833	12.00	34
35	259.2	1161.0	228.5	932.5	.0856	11.68	35
36	260.9	1161.5	230.2	931.3	.0879	11.38	36
37	262.5	1162.0	231.9	930.1	.0902	11.09	37
38	264.1	1162.5	233.5	929.0	.0925	10.81	38
39	265.6	1162.9	235.0	927.9	.0948	10.55	39
40	267.1	1163.4	236.5	926.9	.0971	10.30	40
41	268.6	1163.9	238.0	925.9	.0993	10.07	41
42	270.1	1164.3	239.5	924.8	.1016	9.843	42
43	271.5	1164.7	241.0	923.7	.1039	9.625	43
44	272.9	1165.2	242.4	922.8	.1062	9.416	44
45	274.3	1165.6	243.8	921.8	.1085	9.217	45

Properties of Saturated Steam—Continued.

p	t	H	h	L	w	v	p
46	275.7	1166.0	245.2	920.8	.1108	9.025	46
47	277.0	1166.4	246.6	919.8	.1130	8.850	47
48	278.3	1166.8	247.9	918.9	.1152	8.681	48
49	279.6	1167.2	249.2	918.0	.1175	8.511	49
50	280.9	1167.6	250.5	917.1	.1197	8.354	50
51	282.1	1168.0	251.8	916.2	.1220	8.197	51
52	283.3	1168.3	253.0	915.3	.1242	8.052	52
53	284.5	1168.7	254.2	914.5	.1264	7.911	53
54	285.7	1169.1	255.4	913.7	.1287	7.770	54
55	286.9	1169.4	256.6	912.8	.1309	7.639	55
56	288.1	1169.8	257.8	912.0	.1332	7.508	56
57	289.2	1170.1	259.0	911.1	.1354	7.386	57
58	290.3	1170.5	260.1	910.4	.1376	7.267	58
59	291.4	1170.8	261.2	909.6	.1398	7.153	59
60	292.5	1171.2	262.3	908.9	.1420	7.042	60
61	293.6	1171.5	263.4	908.1	.1443	6.930	61
62	294.7	1171.8	264.5	907.3	.1465	6.826	62
63	295.7	1172.1	265.6	906.5	.1487	6.725	63
64	296.6	1172.5	266.7	905.8	.1509	6.627	64
65	297.8	1172.8	267.7	905.1	.1531	6.532	65
66	298.8	1173.1	268.7	904.4	.1553	6.439	66
67	299.8	1173.4	269.7	903.7	.1575	6.349	67
68	300.8	1173.7	270.7	903.0	.1597	6.262	68
69	301.8	1174.0	271.7	902.3	.1619	6.177	69
70	302.7	1174.3	272.7	901.6	.1641	6.094	70
71	303.7	1174.6	273.7	900.9	.1663	6.013	71
72	304.6	1174.8	274.7	900.1	.1685	5.935	72
73	305.6	1175.1	275.7	899.4	.1707	5.858	73
74	306.5	1175.4	276.6	898.8	.1729	5.784	74
75	307.4	1175.7	277.5	898.2	.1751	5.711	75
76	308.3	1176.0	278.4	897.6	.1773	5.640	76
77	309.2	1176.2	279.3	896.9	.1795	5.571	77
78	310.1	1176.5	280.2	896.3	.1817	5.504	78
79	311.0	1176.8	281.1	895.7	.1839	5.438	79
80	311.8	1177.0	282.0	895.0	.1860	5.376	80
81	312.7	1177.3	282.9	894.4	.1882	5.313	81
82	313.5	1177.6	283.7	893.9	.1904	5.252	82
83	314.4	1177.8	284.6	893.2	.1926	5.192	83
84	315.2	1178.1	285.5	892.6	.1948	5.133	84
85	316.0	1178.3	286.3	892.0	.1970	5.076	85
86	316.8	1178.6	287.1	891.5	.1991	5.023	86
87	317.7	1178.8	288.0	890.8	.2013	4.968	87
88	318.5	1179.1	288.8	890.3	.2035	4.914	88
89	319.3	1179.3	289.6	889.7	.2056	4.864	89
90	320.1	1179.6	290.4	889.2	.2078	4.812	90
91	320.8	1179.8	291.2	888.6	.2100	4.762	91
92	321.6	1180.0	292.0	888.0	.2122	4.713	92
93	322.4	1180.3	292.8	887.5	.2143	4.666	93
94	323.1	1180.5	293.6	886.9	.2165	4.619	94
95	323.9	1180.7	294.4	886.3	.2186	4.575	95
96	324.6	1180.9	295.1	885.8	.2208	4.529	96
97	325.4	1181.2	295.9	885.3	.2229	4.486	97
98	326.1	1181.4	296.6	884.8	.2251	4.442	98
99	326.9	1181.6	297.4	884.2	.2273	4.399	99
100	327.6	1181.9	298.1	883.8	.2294	4.359	100
101	328.3	1182.1	298.8	883.3	.2316	4.318	101
102	329.0	1182.3	299.6	882.7	.2337	4.279	102
103	329.7	1182.5	300.3	882.2	.2359	4.239	103
104	330.4	1182.7	301.0	881.7	.2380	4.202	104
105	331.1	1182.9	301.7	881.2	.2402	4.163	105

Properties of Saturated Steam—Continued.

p	t	H	h	L	w	v	p
106	331.8	1183.1	302.4	880.7	.2423	4.127	106
107	332.5	1183.4	303.1	880.3	.2445	4.090	107
108	333.2	1183.6	303.8	879.8	.2466	4.055	108
109	333.9	1183.8	304.5	879.3	.2488	4.019	109
110	334.5	1184.0	305.2	878.8	.2509	3.986	110
111	335.2	1184.2	305.9	878.3	.2530	3.953	111
112	335.9	1184.4	306.6	877.8	.2552	3.918	112
113	336.5	1184.6	307.3	877.3	.2573	3.887	113
114	337.2	1184.8	308.0	876.8	.2595	3.854	114
115	337.8	1185.0	308.6	876.4	.2616	3.823	115
116	338.5	1185.2	309.3	875.9	.2637	3.792	116
117	339.1	1185.4	309.9	875.5	.2659	3.761	117
118	339.8	1185.6	310.6	875.0	.2680	3.731	118
119	340.4	1185.8	311.2	874.6	.2702	3.701	119
120	341.0	1185.9	311.9	874.0	.2723	3.672	120
121	341.7	1186.2	312.6	873.6	.2744	3.644	121
122	342.3	1186.3	313.2	873.1	.2765	3.617	122
123	342.9	1186.5	313.8	872.7	.2787	3.588	123
124	343.5	1186.7	314.4	872.3	.2808	3.561	124
125	344.1	1186.9	315.0	871.9	.2829	3.525	125
126	344.7	1187.1	315.6	871.5	.2850	3.509	126
127	345.3	1187.3	316.3	871.0	.2872	3.482	127
128	345.9	1187.4	316.9	870.5	.2893	3.457	128
129	346.5	1187.6	317.5	870.1	.2914	3.432	129
130	347.1	1187.8	318.1	869.7	.2935	3.407	130
131	347.7	1188.0	318.7	869.3	.2957	3.382	131
132	348.3	1188.2	319.3	868.9	.2978	3.358	132
133	348.8	1188.3	319.9	868.4	.2999	3.334	133
134	349.4	1188.5	320.5	868.0	.3020	3.311	134
135	350.0	1188.7	321.1	867.6	.3042	3.287	135
136	350.6	1188.9	321.7	867.2	.3063	3.265	136
137	351.1	1189.0	322.3	866.7	.3084	3.243	137
138	351.7	1189.2	322.9	866.3	.3105	3.221	138
139	352.3	1189.4	323.5	865.9	.3126	3.199	139
140	352.8	1189.5	324.0	865.5	.3147	3.178	140
141	353.4	1189.7	324.6	865.1	.3169	3.156	141
142	353.9	1189.9	325.1	864.8	.3190	3.135	142
143	354.5	1190.1	325.7	864.4	.3211	3.114	143
144	355.0	1190.2	326.3	863.9	.3232	3.094	144
145	355.6	1190.4	326.9	863.5	.3253	3.074	145
146	356.1	1190.6	327.4	863.2	.3274	3.054	146
147	356.7	1190.7	328.0	862.7	.3295	3.035	147
148	357.2	1190.9	328.5	862.4	.3316	3.016	148
149	357.7	1191.0	329.0	862.0	.3337	2.997	149
150	358.2	1191.2	329.6	861.6	.3358	2.978	150
151	358.8	1191.4	330.2	861.2	.3379	2.959	151
152	359.3	1191.5	330.7	860.8	.3400	2.941	152
153	359.8	1191.7	331.2	860.5	.3421	2.923	153
154	360.3	1191.8	331.7	860.1	.3442	2.905	154
155	360.8	1192.0	332.2	859.8	.3463	2.888	155
156	361.4	1192.2	332.8	859.4	.3484	2.870	156
157	361.9	1192.3	333.3	859.0	.3504	2.854	157
158	362.4	1192.5	333.9	858.6	.3525	2.837	158
159	362.9	1192.6	334.4	858.2	.3546	2.820	159
160	363.4	1192.8	334.9	857.9	.3567	2.803	160

Properties of Saturated Steam—Continued.

p	t	H	h	L	w	v	p
161	363.9	1192.9	335.4	875.5	.3588	2.787	161
162	364.4	1193.1	335.9	857.2	.3609	2.771	162
163	364.9	1193.2	336.4	856.8	.3630	2.755	163
164	365.4	1193.4	336.9	856.5	.3651	2.739	164
165	365.9	1193.5	337.4	856.1	.3672	2.723	165
166	366.3	1193.7	337.9	855.8	.3693	2.708	166
167	366.8	1193.8	338.4	855.4	.3714	2.693	167
168	367.3	1194.0	338.9	855.1	.3734	2.678	168
169	367.8	1194.1	339.4	854.7	.3755	2.663	169
170	368.3	1194.3	339.9	854.4	.3776	2.648	170
171	368.7	1194.4	340.4	854.0	.3797	2.634	171
172	369.2	1194.5	340.9	853.6	.3818	2.619	172
173	369.7	1194.7	341.4	853.3	.3839	2.605	173
174	370.1	1194.8	341.8	853.0	.3860	2.591	174
175	370.6	1195.0	342.3	852.7	.3880	2.577	175
176	371.1	1195.1	342.8	852.3	.3901	2.563	176
177	371.5	1195.2	343.3	851.9	.3922	2.550	177
178	372.0	1195.4	343.8	851.6	.3943	2.536	178
179	372.5	1195.6	344.3	851.3	.3963	2.523	179
180	372.9	1195.7	344.7	851.0	.3984	2.510	180
181	373.4	1195.8	345.2	850.6	.4005	2.497	181
182	373.8	1195.9	345.7	850.2	.4026	2.484	182
183	374.3	1196.1	346.2	849.9	.4047	2.471	183
184	374.7	1196.2	346.6	849.6	.4067	2.459	184
185	375.2	1196.4	347.1	849.3	.4088	2.446	185
186	375.6	1196.5	347.5	849.0	.4109	2.434	186
187	376.0	1196.6	348.0	848.6	.4130	2.421	187
188	376.5	1196.8	348.5	848.3	.4151	2.409	188
189	376.9	1196.9	348.9	848.0	.4171	2.398	189
190	377.4	1197.0	349.4	847.6	.4192	2.385	190
191	377.8	1197.2	349.8	847.4	.4213	2.374	191
192	378.3	1197.3	350.3	847.0	.4234	2.362	192
193	378.7	1197.4	350.7	846.7	.4254	2.351	193
194	379.1	1197.6	351.2	846.4	.4275	2.339	194
195	379.6	1197.7	351.7	846.0	.4296	2.328	195
196	380.0	1197.8	352.1	845.7	.4317	2.316	196
197	380.4	1198.0	352.5	845.5	.4338	2.305	197
198	380.8	1198.1	352.9	845.2	.4359	2.294	198
199	381.3	1198.2	353.4	844.8	.4380	2.283	199
200	381.7	1198.4	353.8	844.6	.4400	2.273	200
205	383.8	1199.0	356.0	843.0	.4504	2.220	205
210	385.8	1199.6	358.1	841.5	.4608	2.170	210
215	387.8	1200.2	360.2	840.0	.4712	2.122	215
220	389.8	1200.8	362.2	838.6	.4816	2.076	220
225	391.7	1201.4	364.2	837.2	.4920	2.033	225
230	393.6	1202.0	366.2	835.8	.5024	1.990	230
240	397.3	1203.1	370.1	833.0	.5231	1.912	240
250	400.9	1204.2	373.8	830.4	.5439	1.839	250
260	404.4	1205.3	377.5	827.8	.5646	1.771	260
270	407.8	1206.3	381.0	825.3	.5854	1.708	270
280	411.1	1207.3	384.4	822.9	.6061	1.650	280
290	414.3	1208.3	387.8	820.5	.6268	1.595	290
300	417.4	1209.2	391.0	818.2	.6475	1.544	300
325	424.8	1211.5	398.7	812.8	.6990	1.431	325
350	431.8	1213.6	406.0	807.6	.7505	1.332	350

HOW TO ASCERTAIN HORSEPOWER OF BOILERS.

Standard adopted by American Society of Mechanical Engineers is 30 pounds of water evaporated into dry steam per hour from temperature of feed water 100° Fahrenheit, into steam of 70 pounds pressure.

Compound engines will develop a horsepower on 15 pounds of water.

Single condensing engine will develop a horsepower on 18 to 22 pounds of water.

Automatic non-condensing engine will develop a horsepower on 28 to 32 pounds of water.

Slide-valve throttle-governing engine will develop a horsepower on one cubic foot, or 62½ pounds of water.

STEAM MEMORANDA.

A cubic inch of water evaporated under ordinary atmosphere pressure is converted into one cubic foot of steam (approximately).

The specific gravity of steam (at atmospheric pressure) is .411 that of air at 34° Fahrenheit, and .0006 that of water at same temperature.

27.222 cubic feet of steam weigh one pound; 13.817 cubic feet of air weigh one pound.

Locomotives average a consumption of 3,000 gallons of water per 100 miles run.

The best designed boilers, well set, with good draft, and skillful firing, will evaporate from 7 to 10 pounds of water per pound of first-class coal.

On one square foot of grate can be burned on an average from 10 to 12 pounds of hard coal, or 18 to 20 pounds of soft coal, per hour, with natural draft. With forced draft nearly double these amounts can be burned.

Steam engines, in economy, vary from 14 to 60 pounds of feed water, and from 1½ to 7 pounds of coal per hour per indicated horsepower.

Condensing engines require from 20 to 30 gallons of water, at an average low temperature, to condense the steam represented by every gallon of water evaporated in the boilers supplying the engines—approximately for most engines, we say, from 1 to 1½ gallons condensing water per minute, per indicated horsepower.

HORSEPOWER OF AN ENGINE.

a=Area of the piston in square inches.

p=Mean effective pressure of the steam on the piston per square inch.

v=Velocity of piston per minute.

$$\text{Then H. P.} = \frac{a \times p \times v}{33,000}$$

The mean pressure in the cylinder when cutting off at

stroke	= boiler	pressure multiplied by	
1/4	"	"	.597
1/3	"	"	.670
1/2	"	"	.743
2/3	"	"	.847
3/4	"	"	.919
4/5	"	"	.937
5/6	"	"	.966
7/8	"	"	.992

To find the diameter of a cylinder of an engine of a required nominal horsepower:

$$\frac{5500}{v} \text{ multiplied by H. P.} = a.$$

To find the weight of the rim of the flywheel for an engine:

$$\text{Nominal H. P. multiplied by 2000}$$

$$\frac{\text{The square of the velocity of the circumference in feet per second}}{\text{The square of the velocity of the circumference in feet per second}} = \text{wt. in cwts.}$$

WATER.

Doubling the diameter of a pipe increases its capacity four times. Friction of liquids in pipes increases as the square of the velocity.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .434. Approximately, we say that every foot elevation is equal to $\frac{1}{2}$ pound pressure per square inch; this allows for ordinary friction.

To find the diameter of a pump cylinder to remove a given quantity of water per minute (100 feet of piston being the standard of speed), divide the number of gallons by 4, then extract the square root, and the product will be the diameter in inches of the pump cylinder.

To find quantity of water elevated in one minute, running at 100 feet of piston speed per minute; square the diameter of the water cylinder in inches, and multiply by 4.

Example—Capacity of a 5-inch cylinder is desired. The square of the diameter (5 inches) is 25, which, multiplied by 4, gives 100, the number of gallons per minute (approximately).

To find the horsepower necessary to elevate water to a given height, multiply the weight of the water elevated per minute in pounds by the height in feet, and divide the product by 33,000 (an allowance should be added for water friction, and a further allowance for loss in steam cylinder, say from 20 to 30 percent).

The area of the steam piston, multiplied by the steam pressure, gives the total amount of pressure that can be exerted. The area of the water piston, multiplied by the pressure of water per square inch, gives the resistance. A margin must be made between the power and the resistance to move the pistons at the required speed, say from 20 to 40 percent, according to speed and other conditions.

To find the capacity of a cylinder in gallons, multiply the area in inches by the length of stroke in inches, will give the total number of cubic inches; divide this amount by 231 (which is the cubical contents of a U. S. gallon in inches), and product is the capacity in gallons.

ELECTRICAL UNITS.

Volt—The unit of electrical motive force. Force required to send one ampere of current through one ohm of resistance.

Ohm—Unit of resistance. The resistance offered to the passage of one ampere, when impelled by one volt.

Ampere—Unit of current. The current which one volt can send through a resistance of one ohm.

Coulomb—Unit of quantity. Quantity of current which, impelled by one volt, would pass through one ohm in one second.

Farad—Unit of capacity. A conductor or condenser which will hold one coulomb under the pressure of one volt.

Joule—Unit of work. The work done by one watt in one second.

Watt—The unit of electrical energy, and is the product of ampere and volt. That is, one ampere of current flowing under a pressure of one volt gives one watt of energy.

One electrical horsepower is equal to 746 watts.

One Kilowatt is equal to 1,000 watts.

To find the watts consumed in a given electrical circuit, such as a lamp, multiply the volts by the amperes.

To find the volts, divide the watts by the amperes

To find the amperes, divide the watts by the volts.

To find the electrical horsepower required by a lamp, divide the watts of the lamp by 746.

To find the number of lamps that can be supplied by one electrical horsepower of energy, divide 746 by the watts of the lamp.

To find the electrical horsepower necessary, multiply the watts per lamp by the number of lamps, and divide by 746.

To find the mechanical horsepower necessary to generate the required electrical horsepower, divide the latter by the efficiency of the generator.

To find the amperes of a given circuit, of which the volts and ohms resistance are known, divide the volts by the ohms.

To find the volts, when the amperes and watts are known, multiply the amperes by the ohms.

To find the resistance in ohms, when the volts and amperes are known, divide the volts by the amperes.

RULES FOR CALCULATING SPEED OF PULLEYS.

PROBLEM 1.—The diameter of the driver and driven being given, to find the number of revolutions of the driven:

RULE.—Multiply the diameter of the driver by its number of revolutions, and divide the product by the diameter of the driven; the quotient will be the number of revolutions.

PROBLEM 2.—The diameter and the revolutions of the driver being given, to find the diameter of the driven, that shall make any given number of revolutions in the same time:

RULE.—Multiply the diameter of the driver by its number of revolutions, and divide the product by the number of revolutions of the driven; the quotient will be its diameter.

PROBLEM 3.—To ascertain the size of the driver:

RULE.—Multiply the diameter of the driven by the number of revolutions you wish to make, and divide the product by the revolutions of the driver; the quotient will be the size of the driver.

The above rules are practically correct. Though, owing to the slip, elasticity and thickness of the belt, the circumference of the driven seldom runs as fast as the driver.

Belts, like gears, have a pitch-line, or a circumference of uniform motion. The circumference is within the thickness of the belt, and must be considered if pulleys differ greatly in diameter and a required speed is absolutely necessary.

Sizes of Tap Drills for U. S. Standard Threads.

By the formulas given below, the results, strictly speaking, are the diameters of the bottoms of the threads. The tap drill is, in common practice, the one that is one or two gauge numbers larger, for the smaller or numbered sizes, and one that is about .005" larger for the larger sizes. The amount allowed for clearance varies in different shops and on different classes of work.

Size of Tap Drill for U. S. Standard Thread=

$$\frac{\text{outside diameter of screw} - 1.299}{\text{Threads to the inch.}}$$

Size of Tap Drill for $\frac{1}{4}$ -inch screw, U. S. Standard Thread, 10 threads to the inch= $.750 - \frac{1.299}{10} = .750 - .1299 = .6201$, size of Tap Drill.

Diameter of Screw.	Threads per Inch.	Size of Tap Drill.	Diameter of Screw.	Threads per Inch.	Size of Tap Drill.
$\frac{1}{4}$	20	.185	$\frac{1}{2}$	4	1.712
$\frac{5}{16}$	18	.240	$\frac{3}{4}$	4	1.962
$\frac{3}{8}$	16	.294	$\frac{1}{2}$	4	2.176
$\frac{7}{16}$	14	.344	$\frac{3}{4}$	4	2.426
$\frac{1}{2}$	13	.400	$\frac{1}{2}$	3	2.629
$\frac{9}{16}$	12	.454	$\frac{3}{4}$	3	2.879
$\frac{5}{8}$	11	.507	$\frac{1}{2}$	3	3.100
$\frac{3}{4}$	10	.620	$\frac{3}{4}$	3	3.317
$\frac{7}{8}$	9	.731	$\frac{1}{2}$	4	3.567
1	8	.837	$\frac{3}{4}$	2	3.798
$1\frac{1}{8}$	7	.940	$\frac{1}{2}$	2	4.028
$1\frac{1}{4}$	7	1.065	$\frac{3}{4}$	2	4.256
$1\frac{3}{8}$	6	1.160	$\frac{1}{2}$	2	4.480
$1\frac{1}{2}$	6	1.284	$\frac{3}{4}$	2	4.730
$1\frac{3}{4}$	5	1.389	$\frac{1}{2}$	2	4.953
$1\frac{7}{8}$	5	1.491	$\frac{3}{4}$	2	5.203
$1\frac{1}{2}$	5	1.616	$\frac{1}{2}$	2	5.423

Size of Tap Drills for V Threads.

Size of Tap Drill for V Thread=

$$\frac{\text{outside diameter of screw} - 1.732}{\text{Threads to the inch.}}$$

Size of Tap Drill for $\frac{3}{4}$ " V Thread, 10 Threads to the inch= $.750 - \frac{1.732}{10} = .750 - .1732 = .5768$, size of Tap Drill.

STANDARD SCREW THREADS.

Number of Threads per inch.	U. S. STANDARD.		V STANDARD			ACME STANDARD.	
	Single Depth.	Double Depth.	Width of Flat.	Single Depth.	Double Depth.	Single Depth.	Double Depth.
2	.3247	.6495	.0625	.4330	.8660	.2600	.5200
3	.2165	.4330	.0416	.2886	.5772	.1767	.3534
4	.1623	.3247	.0312	.2165	.4330	.1350	.2700
5	.1299	.2598	.0250	.1732	.3464	.1100	.2200
6	.1082	.2165	.0208	.1443	.2886	.0933	.1866
6½	.0999	.1998	.0192	.1332	.2664	.....	.....
7	.0927	.1855	.0178	.1237	.2474	.0814	.1628
8	.0811	.1623	.0156	.1082	.2165	.0725	.1450
9	.0721	.1443	.0138	.0962	.1924	.0655	.1310
10	.0649	.1299	.0125	.0866	.1732	.0600	.1200
11	.0590	.1181	.0113	.0787	.1574	.....	.....
11½	.0564	.1129	.0108	.0753	.1506	.....	.....
12	.0541	.1082	.0104	.0721	.1442	.....	.....
13	.0499	.0999	.0096	.0666	.1332	.....	.....
14	.0463	.0927	.0089	.0618	.1237	.....	.....
16	.0405	.0811	.0078	.0541	.1082	.....	.....
18	.0360	.0721	.0069	.0481	.0962	.....	.....
20	.0324	.0649	.0062	.0433	.0866	.....	.....
22	.0295	.0590	.0059	.0393	.0787	.....	.....
24	.0270	.0541	.0052	.0360	.0721	.....	.....
25	.0259	.0519	.0050	.0346	.0692	.....	.....
26	.0249	.0499	.0048	.0333	.0666	.....	.....
27	.0240	.0481	.0046	.0318	.0637	.....	.....
28	.0231	.0463	.0044	.0309	.0618	.....	.....
30	.0216	.0433	.0041	.0288	.0577	.....	.....
32	.0202	.0405	.0039	.0270	.0541	.....	.....
34	.0191	.0382	.0036	.0254	.0509	.....	.....
36	.0180	.0360	.0032	.0240	.0481	.....	.....
40	.0162	.0324	.0031	.0216	.0433	.....	.....

U. S. STANDARD BOLT SIZES.

Diameter of Tap.	Threads Per Inch.	Mill.	Across Corners.	Thickness, U. S. Standard.	Depth of Thread.	Exact Size of Hole.	Tap Drill Used.	Width of Flat.	Area of Root of Thread.	Safe Strain in Lbs. Factor of Safety. Iron at 50,000 Lbs. Per Square Inch.
$\frac{1}{8}$	20	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	.0795	.1910	.1960	.0056	.0286	286
$\frac{3}{16}$	18	$\frac{3}{16}$	$\frac{3}{16}$	$\frac{1}{8}$	.0361	.2403	.2460	.0069	.0452	452
$\frac{1}{4}$	16	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{3}{8}$	.0466	.2938		.0078	.0677	677
$\frac{5}{16}$	14	$\frac{5}{16}$	$\frac{5}{16}$	$\frac{1}{2}$	.0500	.3447		.0089	.0933	933
$\frac{3}{8}$	13	$\frac{3}{8}$	$\frac{3}{8}$	$\frac{3}{4}$	.0542	.4001		.0096	.1257	1257
$\frac{7}{16}$	12	$\frac{7}{16}$	$\frac{7}{16}$	1	.0590	.4542		.0104	.1620	1620
$\frac{1}{2}$	11	$\frac{1}{2}$	$\frac{1}{2}$	1 1/4	.0650	.5069		.0114	.2018	2018
$\frac{9}{16}$	10	$\frac{9}{16}$	$\frac{9}{16}$	1 1/2	.0722	.5681		.0125	.3020	3020
$\frac{5}{8}$	9	$\frac{5}{8}$	$\frac{5}{8}$	1 3/4	.0812	.6376		.0139	.4194	4194
1	8	1	1	2	.0928	.7304		.0156	.5509	5509
$1\frac{1}{8}$	7	$1\frac{1}{8}$	$1\frac{1}{8}$	2 1/2	.1083	.8394		.0179	.6930	6930
$1\frac{1}{4}$	7	$1\frac{1}{4}$	$1\frac{1}{4}$	3	.1200	1.0644		.0208	.8890	8890
$1\frac{3}{8}$	6	$1\frac{3}{8}$	$1\frac{3}{8}$	3 1/2	.1300	1.1585		.0208	1.0540	10540
$1\frac{1}{2}$	6	$1\frac{1}{2}$	$1\frac{1}{2}$	4	.1444	1.2835		.0250	1.2930	12930
$1\frac{3}{4}$	5	$1\frac{3}{4}$	$1\frac{3}{4}$	4 1/2	.1625	1.4902		.0278	1.7440	17440
2	4 1/2	2	2	5	.1857	1.7113		.0313	2.3000	23000
$2\frac{1}{8}$	4 1/4	$2\frac{1}{8}$	$2\frac{1}{8}$	6	.1625	1.9613		.0313	3.0210	30210
$2\frac{1}{4}$	4	$2\frac{1}{4}$	$2\frac{1}{4}$	7	.1857	2.1752		.0313	3.7140	37140
$2\frac{3}{8}$	4	$2\frac{3}{8}$	$2\frac{3}{8}$	8	.1857	2.4252		.0357	4.6180	46180
3	3 1/2	3	3	9	.1857	2.6288		.0357	5.4279	54279

Mill or distance across flats equals $1\frac{1}{2}$ times the diam. of tap plus $\frac{1}{8}$ inch.

Across corners or long diam. equals 1.155 times the mill. Table gives nearest $\frac{1}{16}$ larger.

Exact depth of thread equals .65 times the pitch. Width of flat on thread equals $\frac{1}{8}$ the pitch.

Exact size of hole U. S. Standard equals diameter Tap minus No. thr. per in. $\frac{1.299}{1.299}$ = Tap Drill nearest $\frac{1}{16}$ larger.

Bolt Heads same dimensions as Nuts.

DIFFERENT STANDARDS FOR WIRE GAUGE IN USE IN THE UNITED STATES.

Dimensions of Sizes in Decimal Parts of an Inch.

Number of Wire Gauge	American or Brown & Sharpe	Birmingham or Stub's Wire	Washburn & Mason Mfg. Co. Worcester, Mass.	Imperial Wire Gauge	Stub's Steel Wire	U. S. Standard for Plate
000000	.....	.....	.....	.464	.....	.46875
00000	.....	.....	.....	.432	.....	.4375
0000	.46	.454	.3938	.400	.....	.40625
000	.40964	.425	.3625	.372	.....	.375
00	.3648	.38	.3310	.348	.....	.34375
0	.32486	.34	.3065	.324	.....	.3125
1	.2893	.3	.2830	.300	.227	.28125
2	.25763	.284	.2625	.276	.219	.265625
3	.22942	.259	.2437	.252	.212	.25
4	.20431	.238	.2253	.232	.207	.234375
5	.18194	.22	.2070	.212	.204	.21875
6	.16202	.203	.1920	.192	.201	.203125
7	.14428	.18	.1770	.176	.199	.1875
8	.12849	.165	.1620	.160	.197	.171875
9	.11443	.148	.1483	.144	.194	.15625
10	.10189	.134	.1350	.128	.191	.140625
11	.090742	.12	.1205	.116	.188	.125
12	.080808	.109	.1055	.104	.185	.109375
13	.071961	.095	.0915	.092	.182	.09375
14	.064084	.083	.0800	.080	.180	.078125
15	.057068	.072	.0720	.072	.178	.0703125
16	.05082	.065	.0625	.064	.175	.0625
17	.045257	.058	.0540	.056	.172	.05625
18	.040303	.049	.0475	.048	.168	.05
19	.03589	.042	.0410	.040	.164	.04375
20	.031961	.035	.0348	.036	.161	.0375
21	.028462	.032	.03175	.032	.157	.034375
22	.025347	.028	.0286	.028	.155	.03125
23	.022571	.025	.0258	.024	.153	.028125
24	.0201	.022	.0230	.022	.151	.025
25	.0179	.02	.0204	.020	.148	.021875
26	.01594	.018	.0181	.018	.146	.01875
27	.014195	.016	.0173	.0164	.143	.0171875
28	.012641	.014	.0162	.0149	.139	.015625
29	.011257	.013	.0150	.0136	.134	.0140625
30	.010025	.012	.0140	.0124	.127	.0125
31	.008928	.01	.0132	.0116	.120	.0109375
32	.00795	.009	.0128	.0108	.115	.01015625
33	.00708	.008	.0118	.0100	.112	.009375
34	.006304	.007	.0104	.0092	.110	.00859375
35	.005614	.005	.0095	.0084	.108	.0078125
36	.005	.004	.0090	.0076	.106	.00703125
37	.00453	.....	.....	.0068	.103	.006640625
38	.003905	.....	.....	.0060	.101	.00625
39	.003531	.....	.....	.0052	.099	.....
40	.003144	.....	.....	.0048	.097	.....

TENSILE STRENGTH OF MATERIALS.

Average Value in Pounds per Square Inch.

METALS.

Antimony	1053
Aluminum—Castings	15000
Sheet	24000
Bars	28000
Brass, Yellow	26880
Bronze—Delta Metal—Cast	44800
“ “ Rolled	67200
Gun Metal	30000
Phosphor	45000
Manganese	62720
Tobin	78500
Copper Cast	22400
Sheet	30240
Wire	40000
Gold	20384
Iron, Cast	18000
Wrought	45000
Lead, Cast	1800
Roll Sheet	3320
Platinum Wire	53000
Silver, Cast	40000

Steel—Cast	55000
Forgings	60000
Tin, Cast	3360
Zinc, Cast	3360
Sheet	15680

WOODS.

Ash	11000 to 17000
Beech	11500 to 18000
Cedar	10300 to 11400
Chestnut	10500
Elm	13000 to 13489
Hemlock	8700
Hickory	12800 to 18000
Locust	20500 to 24800
Maple	10500 to 10584
Oak, White	10253 to 19500
Pine, White	10000 to 12000
Pine, Yellow	12600 to 19200
Spruce	10000 to 19500
Walnut, Black	9286 to 16000

MEASURES OF WEIGHT, CAPACITY AND AREA.

LONG MEASURE.

12 inches = 1 foot.
3 feet = 1 yard.
5½ yards = 1 rod.
4 rods = 1 chain.
10 chains = 1 furlong.
8 furlongs = 1 mile.

CUBIC MEASURE.

1728 cubic inches = 1 cubic foot.
27 cubic feet = 1 cubic yard.
24.75 cubic feet = 1 perch.
128 cubic feet = 1 cord.

SQUARE MEASURE.

144 sq. inches = 1 sq. foot.
9 sq. feet = 1 sq. yard.
30¼ sq. yards = 1 sq. rod.
160 sq. rods = 1 acre.
640 acres = 1 sq. mile.

LIQUID MEASURE.

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon.
31½ gallons = 1 barrel.
2 barrels = 1 hogshead.

AVOIRDUPOIS WEIGHT.

16 ounces = 1 pound.
100 pounds = 1 hundredweight.
20 cwt. = 1 ton.

WEIGHT OF MATERIALS
METALS AND ALLOYS.

MATERIAL.	Specific Gravity.	Weight in Lbs. of One		Cub. In. in Lb.
		Cu. Ft.	Cu. In.	
Aluminum, cast	2.569	160	.093	10.80
" wrought	2.681	167	.097	10.35
" bronze	7.787	485	.281	3.56
Antimony	6.712	418	.242	4.13
Arsenic	5.748	358	.207	4.83
Bismuth	9.827	612	.454	2.82
Brass—cast	8.430	490	.284	3.53
" —Muntz—metal	8.109	525	.304	3.29
" —naval (rolled)	8.221	505	.292	3.42
" —sheet	8.510	512	.296	3.37
" —wire	8.510	530	.307	3.26
" —sheet	8.462	527	.305	3.28
" —wire	8.558	533	.308	3.24
Bronze (gun-metal)	8.478	528	.306	3.27
" —average	8.863	552	.319	3.13
Copper—cast	8.735	544	.315	3.18
" —hammered	8.622	537	.311	3.22
" —sheet	8.927	556	.322	3.11
" —wire	8.815	549	.318	3.15
Gold (pure)	8.895	554	.321	3.12
" standard 22 carat fine	19.316	1203	.696	1.44
" (Gold 11—Copper 1)	17.502	1090	.631	1.59
Iron—cast	6.904	430	.249	4.02
" —average	7.386	460	.266	3.76
Iron—Wrought	7.209	499	.260	3.85
" —average	7.547	470	.272	3.68
Lead—cast	7.803	486	.281	3.56
" —sheet	7.707	480	.278	3.60
" —average	11.368	708	.410	2.44
Manganese	11.432	712	.412	2.43
Nickel—cast	8.012	499	.289	3.46
" —rolled	8.285	516	.299	3.35
Platinum	8.687	541	.313	3.19
Silver	21.516	1340	.775	1.29
" —average	10.517	655	.379	2.64
Steel	7.820	487	.282	3.55
" —average	7.916	493	.285	3.51
Tin	7.868	490	.284	3.53
White Metal (Babbitt's)	7.418	462	.267	3.74
Zinc—cast	7.322	456	.264	3.79
" —sheet	6.872	428	.248	4.04
" —average	7.209	449	.260	3.85

WOODS, DRY.

Material.	Weight in Lbs. of one Cu. Ft.	Material.	Weight in Lbs. of one Cu. Ft.
Ash	43-53	Larch	31-37
Beech	43-53	Lignum-vitae	83
Birch	40-46	Mahogany, Honduras	35
Boxwood	57-83	" Spanish	53
Cork	15	Oak—American Red	54
Ebony	70-83	" English	48-58
Elm	34-45	Pine—red	30-44
Fir, spruce	30-44	" white	27-34
Greenheart	70	" yellow	29-41
Hornbeam	47	Teak	41-55

Weight of Materials.—Continued.

Stones, Earth, Etc.

	Wt. in Lbs. of 1 Cu. Ft.		Wt. in Lbs. of 1 Cu. Ft.
Asphaltum	64-112	Grindstone	134
Brick, common	100-125	Lime, quick	52
“ fire	137-150	Limestone and marbles	150-179
Cement, Portland	80-90	Mortar, hardened	88-118
Clay	120	Mud, dry and close	80-110
Concrete	120-140	“ wet and fluid	104-120
Earth	77-120	Sand, dry	88-110
Glass, crown	156	“ wet	118-129
“ flint	187	Sandstone	130-170
“ plate	169	Victoriatone (crushed granite, } Portland cement, silica) } 144	
Granite	164-175		
Gravel	90-125		

MENSURATION OF SURFACES AND VOLUMES.

Area of rectangle = length \times breadth.

Area of triangle = base \times $\frac{1}{2}$ perpendicular height.

Diameter of circle = radius \times 2.

Circumference of circle = diameter \times 3.1416. See table on pages 000.

Area of circle = square of diameter \times .7854. See table on pages 000.

Area of sector of circle = $\frac{\text{area of circle} \times \text{number of degrees in arc}}{360}$

Area of surface of cylinder = circumference \times length + area of two ends.

To find diameter of circle having given area: Divide the area by .7854, and extract the square root.

To find the volume of a cylinder: Multiply the area of the section in square inches by the length in inches = the volume in cubic inches. Cubic inches divided by 1728 = volume in cubic feet.

Surface of a sphere = square of diameter \times 3.1416.

Solidity of a sphere = cube of diameter \times .5236.

Side of an inscribed cube = radius of a sphere \times 1.1547.

Area of the base of a pyramid or cone, whether round, square or triangular, multiplied by one-third of its height = the solidity.

Diam. \times .8862 = side of an equal square.

Diam. \times .7071 = side of an inscribed square.

Radius \times 6.2832 = circumference.

Circumference = $3.5446 \times \sqrt{\text{Area of circle}}$.

Diameter = $1.1283 \times \sqrt{\text{Area of circle}}$.

Length of arc = No. of degrees \times .017453 radius.

Degrees in arc whose length equals radius = $57^\circ 29'58''$.

Length of an arc of 1° = radius \times .017453.

“ “ “ “ 1 Min. = radius \times .0002909.

“ “ “ “ 1 Sec. = radius \times .0000048.

p = Proportion of circumference to diameter = 3.1415926.

p^2 = 9.8696044.

\sqrt{p} = 1.7724538.

Log. = 0.49715.

$1/p$ = 0.31831.

$1/360$ = .002778.

$360/p$ = 114.59.

Mensuration of Surfaces and Volumes.—Continued.

Lineal feet	X	.00019	=	Miles.
" yards	X	.0006	=	" feet.
Square inches	X	.007	=	Square feet.
" feet	X	.111	=	" yards.
" yards	X	.0002067	=	Acres.
Acres	X	4840	=	Square yards.
Cubic inches	X	.00058	=	Cubic feet.
" feet	X	.03704	=	Cubic yards.
Circular inches	X	.00546	=	Square feet.
Cyl. inches	X	.0004546	=	Cubic feet.
" feet	X	.02909	=	" yards.
Links	X	.22	=	Yards.
"	X	.66	=	Feet.
Feet	X	1.5	=	Links.
Width in chains	X	8	=	Acres per mile.
183346 circular in.	X		=	1 square foot.
2200 Cylindrical in.	X		=	1 cubic foot.
Cubic feet	X	7.48	=	U. S. gallons.
" inches	X	.004329	=	U. S. gallons.
U. S. gallons	X	.13367	=	Cubic feet.
U. S. "	X	231	=	" inches.
Cubic feet	X	.8036	=	U. S. bushel.
" inches	X	.000466	=	" "
Cyl. feet of water	X	6	=	U. S. gallons.
Lbs. Avoir.	X	.009	=	cwt. (112)
"	X	.00045	=	Tons. (2240)
Cubic feet of water	X	62.5	=	Lbs. Avoir.
" inch "	X	.03617	=	" "
Cyl. feet water	X	49.1	=	" "
Cyl. inch water	X	.02842	=	" "
13.44 U. S. gallons of water	X		=	1 cwt.
268.8 U. S. "	X		=	1 ton.
1.8 cubic feet of water	X		=	1 cwt.
35.88 " " "	X		=	1 ton.
Column of water, 12 inches high, and 1 inch in diameter	X		=	.341 Lbs.
U. S. bushel	X	.0495	=	Cubic yards.
" " "	X	1.2446	=	" feet.
" " "	X	2150.42	=	inches.

USEFUL INFORMATION.

A gallon of water (United States Standard) weighs 8 $\frac{1}{8}$ pounds and contains 231 cubic inches. A cubic foot of water weighs 62 $\frac{1}{2}$ pounds, and contains 1,728 cubic inches, or 7 $\frac{1}{2}$ gallons.

Each nominal horsepower of boilers requires approximately one-half cubic foot of water per hour.

To find the area of a required pipe, the volume and velocity of water being given, multiply the number of cubic feet of water 144, and divide the product by the velocity in feet per minute. The area being found, it is easy to get the diameter of pipe necessary.

To find the pressure in pounds per square inch of a column of water, multiply the height of the column in feet by .434. (Approximately, every foot elevation is called equal to one-half pound pressure per square inch.)

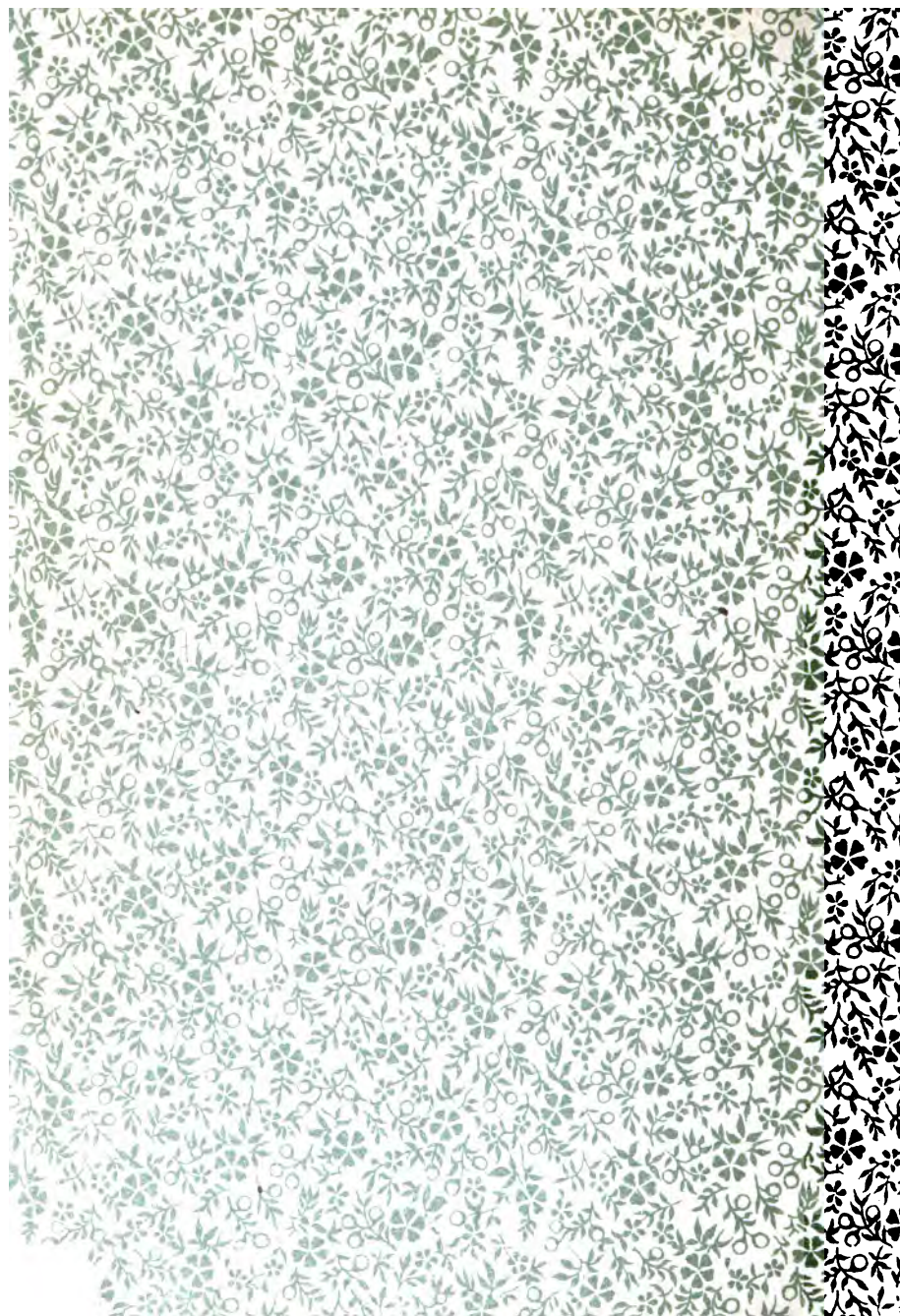
To find the velocity in feet per minute necessary to discharge a given volume of water in a given time, multiply the number of cubic feet of water by 144, and divide the product by the area of the pipe in inches.

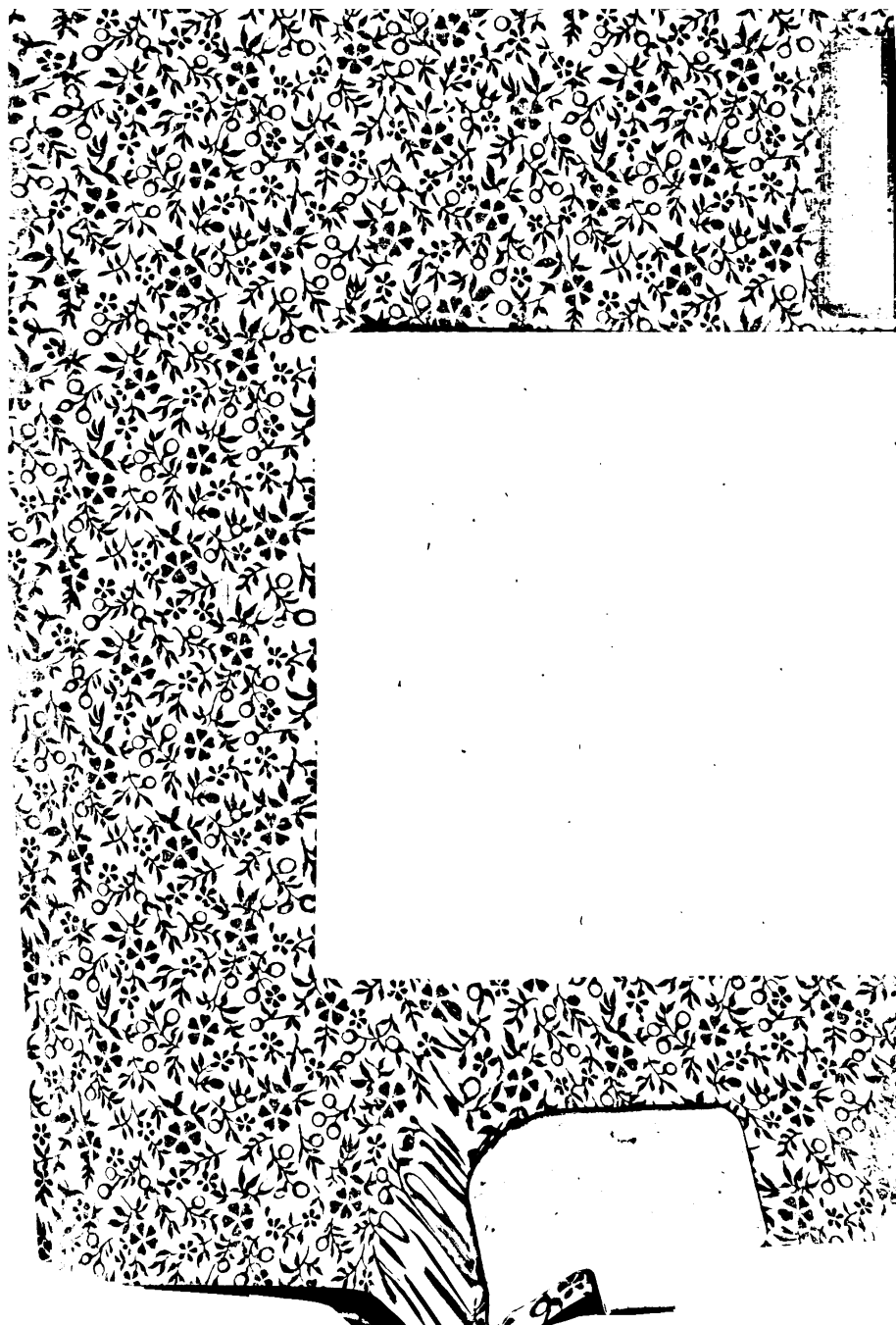
COEFFICIENTS OF LINEAR EXPANSION AT TEMPERATURES BETWEEN 32° FAHR. AND 212° FAHR.

Material.	For 1° Cent.	For 1° Fahr.	Material.	For 1° Cent.	For 1° Fahr.
Aluminum, cast..	.0000222	.0000123	Steel, untempered.	.0000108	.0000060
Aluminum, rolled.	.0000207	.0000115	Steel, tempered...	.0000126	.0000070
Antimony.....	.0000110	.0000061	Tin.....	.0000207	.0000115
Bismuth.....	.0000139	.0000077	Zinc.....	.0000288	.0000160
Brass.....	.0000189	.0000105	Brick, Best Stock.	.0000055	.0000031
Copper.....	.0000171	.0000095	Fire Brick.....	.0000049	.0000027
Gold.....	.0000153	.0000085	Building Stones—		
Iron, cast.....	.0000108	.0000060	From.....	.0000072	.0000040
Iron, wrought....	.0000117	.0000065	To.....	.0000144	.0000080
Lead.....	.0000284	.0000158	Glass.....	.0000088	.0000049
Nickel.....	.0000126	.0000070	Porcelain.....	.0000036	.0000020
Platinum.....	.0000087	.0000048	Roman Cem't dry.	.0000144	.0000080
Silver.....	.0000198	.0000110	Slate.....	.0000104	.0000058
			Wedgewood ware..	.0000088	.0000049

MELTING POINTS OR TEMPERATURES OF FUSION.

Solid	Cent.	Fahr.	Solid	Cent.	Fahr.
Aluminum.....	625	1157	Steel, mild,	1475	2687
Antimony.....	440	824	" hard,	1420	2588
Bismuth.....	265	509	Tin,	228	442
Brass.....	1030	1886	Zinc,	415	779
Bronze.....	920	1688	Carbonic Acid,.....	77.8	108
Copper.....	1055	1931	Glass,	1100	2012
Gold.....	1045	1913	Mercury,	39.7	39.5
Iron, cast grey... .	1220	2228	Nitro-glycerine,	7.2	45
" white.....	1135	2075	Paraffin,	54	129.2
" wrought....	1600	2912	Sulphur,	115	239
Lead.....	325	617	Sulphurous Acid,	100	148
Manganese.....	1900	3452	Tallow,	33.3	92
Platinum.....	1775	3227	Turpentine,	10	14
Silver.....	945	1733	Wax,	65	149





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